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Using Potassium Salts in Printing Practice

A Report of Work Done in the Research Laboratories of the Textile Institute at Reichenberg, Delivered as an Address Before the Meetings of the Ninth Congress of the International Society of Chemists and Colorists, Recently Held in Dresden, Germany

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(*Melliand's Textilberichte*, 1927, 615-616)

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THE use of chemicals in dyeing practice, and hence in printing practice as well, depends on the chemical and physical behavior of these substances. As far as the behavior of these chemicals is concerned, a distinction must be made between the properties of natural groups of simple compounds and the special behavior of combinations of a definite element in the natural group. While it occurs to no one to substitute aluminum, chromium or iron compounds for each other in their application in dyeing practice, because, as is apparent, the effects that are produced with the aid of these chemicals—as, for example, in the formation of lakes—differ very markedly from each other; while it occurs to no one to substitute the calcium compounds employed in the formation of Alizarin Red lakes, by magnesium, strontium or barium compounds, nevertheless it can scarcely be admitted that the sodium soaps cannot be substituted by potassium soaps in dyeing practice, although the potassium soaps have a peculiar action in many ways.

Other potassium compounds are subject to the same conditions as far as their use in dyeing textiles is concerned. The assumption is widely made, and, in fact, is held to be quite common in dyeing practice that wherever it is a question of using compounds of the fixed alkalies for any dyeing purpose, it is possible to obtain good results with sodium compounds.

Technical books that are widely used, and technical articles in publications which are read throughout the industry of the world, contain statements to this effect. The following examples will, however, show how faulty the contention is that potassium compounds may be substituted by sodium compounds without any difficulty or without making any changes in the method used.

The fastness properties of several alizarin dyestuff lakes, especially of Alizarin Red, are still unsurpassed today, and the use of these dyestuffs must be considered as being actually of permanent duration. It is known that the vegetable fibers, which have been prepared for dyeing by treatment with aluminum, chromium and iron mordants, can be locally reserved or discharged by printing with a paste that contain citric acid, which has been found the most suitable substance that can be used for this particular purpose, especially when followed up by steaming. Hence, those places on the fabric that have been treated in this fashion will remain undyed in the dyeing process. If Aniline Black, a dyestuff which cannot be substituted by any other—at the present time at any rate—is printed along with the reserve or discharge paste, then due to the acid action of the discharge agent, citric acid, the reserved or discharged places on the fabric are not always obtained in a pure white state. However, if the places that have been printed with the citric acid discharge are overprinted with Aniline Black, then at those places where the citric acid discharge color and the Aniline Black printing color coincide, white effects are not obtained, and the Aniline Black is fixed on the places which have been printed with the citric accid, where both colors are precipitated uniformly on each other.

Sodium Citrate Not Satisfactory

In order to obtain a pure white effect at the aforementioned places on the fabric, where the Aniline Black color has also been precipitated, it is necessary to use sodium citrate in the place of citric acid.

But sodium citrate fails to produce the desired effect in certain cases. This happens most particularly when heavy Aniline Black overprinted effects are desired. Sodium citrate, although it is soluble with comparative ease in water, can be used only up to a content of 32 per cent in the printing paste.

Potassium citrate is, however, soluble in the proportion

of 60 per cent in the printing paste, for it is considerably more soluble in water than sodium citrate. It is, moreover, a deliquescent salt and hence hygroscopic as well.

The author employed the following printing composition in obtaining absolutely satisfactory results, and also in the heaviest Aniline Black printing, in other words, obtaining a faultless reserved or discharged white effect on the fabric. This printing paste is made from 28 kilograms of crystallized citric acid which were dissolved in 23 liters of water and to which 26.3 kilograms of potassium hydroxide (sodium free) were slowly added. The solution is finally controlled by testing with phenolphthalein paper which must react alkaline when dipped into it. Then 18 kilograms of gum arabic or gum Senegal are stirred into the hot solution, and the solution is further heated until all of the gum has completely dissolved. Then the solution is cooled and stirred.

The essential condition is using potassium hydroxide, which is absolutely free from sodium salts. The finished color paste is allowed to stand for some time before it is used, and this allows all the suspended particles in it to settle to the bottom. When the paste is used, the batches are taken from the top.

It is not advisable to use converted starches, such as British gum, for it has been found that streaks are formed on the printed fabrics. Then again, when Aniline Black is not employed for overprinting the fabric but is printed as the second dyestuff in addition to the white discharge paste, the potassium citrate dye paste will give a much better white effect than a simple citric acid paste.

The potassium citrate discharge pastes are preferable to the straight citric acid discharges even when only unicolor white discharge printing pastes are desired. The mordants used for this purpose are, as need scarcely be mentioned, not oxides but more or less basic salts. Potassium citrate also acts on the other hand as an advantageous neutralizing agent.

Preventing Discoloration

Many of the older formulae for citric acid discharge pastes contain, as well, potassium acid sulphate or sodium acid sulphate, that is, $KHSO_4$ or $NaHSO_4$. This is not only a bad practice from the printing effect standpoint, but it also introduces difficulties in steaming due to the fact that these substances will tend under such conditions to impair the strength of the fiber.

Another example of the advantages that are secured in using potassium compounds is their use with the naphthol preparations employed in the manufacture or production of azo colors on vegetable fibers, particularly in the case of Paranitraniline Red printing and Paranitro-orthoanisidine Red.

In the use of these dyestuffs it has always been a difficulty, of not inconsiderable significance, that the fibers, which are impregnated with a beta-naphthol solution containing sodium hydroxide, soon develop a brown discoloration on being allowed to lie in contact with air. Under these conditions it is no longer possible to obtain a red free from all faults, and the unprinted places on the fabric are no longer a pure white.

According to Lauber, the one most effective aid in overcoming this disadvantage consists in the addition of an antimonyl compound along with glycerin in making the preparations that are alkaline with sodium hydroxide. This addition, as is well known, results in disadvantages when colors of the basic series and tannin are simultaneously used with these preparations.

The author has been able to avoid in its entirety the brownish coloration on goods which have been impregnated with naphthol by employing the following naphthol preparations. Two mixtures are accordingly made. One of these consists of 2,000 grams of beta-naphthol, 1,200 grams of potash which are dissolved in 20 liters of hot water. The second solution consists of 4,000 grams of ricinoleic acid and 1,200 grams of potash which are dissolved in 20 liters of hot water. The two solutions are then united and the combined solution is diluted up to a volume of 100 liters by the addition of hot water.

These solutions must be maintained at a temperature of approximately 40 deg. Cent., while they are being worked up or used, and this is best accomplished by preparing only enough liquor for immediate use and then continuing to prepare fresh liquor as needed, the hot solution being added to the treating apparatus from time to time. Such practice involves no serious operating difficulties. Heating the liquor in a container, where the padding process is carried out, is less advisable. The reason for the necessity of maintaining the solution at the proper temperature is that it is only at and over the temperature of 40 deg. Cent. that the naphthol solution in potassium hydroxide remains perfectly clear.

When sodium hydroxide is employed in the place of potassium hydroxide, the solution is never clear, even at the boiling temperature, but is always turbid.

Goods prepared (slop-padded) in this fashion may be allowed to remain for weeks in the undyed or unprinted condition without any brown coloration ensuing, and, in fact, without any visible change taking place in the fabric. This fact is of particularly great importance in the manufacture of goods that have been previously printed with Aniline Black and that are to be printed with Paranitraline Red, which can then be done for stock goods.

The aforementioned preparations contain an appreciable proportion of ricinoleic acid. It has been found that a red with a bluish tinge is obtained in this fashion. The bluish tinge in Para-Nitraniline Red printing is known to be a very desirable effect.

A Para-Nitraniline Red Bath

Still another change can be effected in the actual use of these preparations. It is known that the diazo liquors, which contain acetic acid, are easily decomposed. Working with these liquors and producing the corresponding

printing pastes are not the most desirable tasks of the dyer and printer by any means. The economy of the process is also poor for the reason that considerable loss is occasioned by the decomposition of the diazo baths inasmuch as they cannot be used after they have been decomposed.

The author has obtained good results with the bath of diazotized Para-Nitraniline Red which is prepared in the following manner: Two solutions are made. The first solution contains 1,000 grams of para-nitraniline which has been made into the form of a paste by the addition of 5 liters of boiling water. The second solution consists of 7,000 grams of ice and 2,000 grams of hydrochloric acid in 19 deg. Be. concentration.

The two solutions are mixed together and well stirred. About 650 grams of solid sodium nitrite are then added in one addition to the resulting solution, which must be at a temperature of approximately minus 5 deg. Cent. The mixture is stirred until the solution is perfectly clear.

The excess of hydrochloric acid, which is likely to exist, is tested with the aid of congo paper. When excess hydrochloric acid is found in the liquor, a further addition of sodium nitrite is required. The solution finally obtained in this fashion is then diluted up to 100 liters. Baths prepared in this fashion will remain stable for a long time.

In the described process, the coupling of the naphthol with the diazo body apparently takes place more slowly than with the prepare that is alkaline with caustic alkali. This is a condition which must be called favorable in comparison with other dyeing processes. In order to obtain full depth of color it is necessary that the fabric, after passing through the diazo bath, be led through a long air passage and be permitted to remain there for thirty minutes to one hour. The author has treated thousands of pieces of goods in this manner for the past twenty years.

An additional advantage is the fact that sodium acetate need not be used in the process, which reduces its cost very materially. It is possible to obtain satisfactory printed effects with the aid of naphthol preparations that have been made alkaline with sodium hydroxide without using diazo colors in acetic acid solution. In this case it is not a question of using sodium phosphate, aluminum sulphate or the like. The author has also found that neutral diazo solutions will remain undecomposed for several days in warm weather. The use of potash, which cannot be replaced with soda, is a well-known condition in Indanthrene colors and principally with the vat colors. The author is also thinking of determining whether or not the use of potassium formaldehyde sulphoxylate or potassium formaldehyde hydrosulphite in the place of the corresponding sodium salts is advantageous in using the aforementioned vat colors. Further experiments will be made later in this field. The author feels that he has proven that the use of potassium salts is not without importance in printing practice.

THROWSTERS' MANUAL ISSUED

The Cost Accounting Manual for Throwsters, which has been in the process of compilation for some time past and which is sponsored by the Commission Throwsters' Division of the Silk Association of America, Inc., will be off the press within the next week, it was announced by the committee in charge of publication which is headed by H. S. Park, of the Read & Lovatt Manufacturing Company.

The aim of the manual is to supply the throwster with a brief though comprehensive and workable plan of cost finding, to develop a plan for determining standard cost of each kind of thread produced, and to suggest a simple method for tying up these standard costs with the financial books of account.

The manual opens with the following introduction:

"Throwsters are coming to realize increasingly the fundamental importance of cost accounting in its relation to manufacturing efficiency. The executive is no longer satisfied with a statement of manufacturing costs as applied to mass production, however accurate or informing. He insists that these familiar items of cost, both direct and indirect, be subjected to a more complete analysis and so organized that he can know with reasonable accuracy the cost of each kind of thread produced, however diversified in size and twist. In other words, he demands that the now generally recognized principles of cost accounting be incorporated in his system of general accounting in order that the present more or less haphazard methods of estimating costs may be superseded by something more scientifically accurate."

VISCOSE MANUFACTURE ON THE SCREEN

Students of the Textile and Chemistry departments of Clemson College, South Carolina, were treated recently to an exhibition motion picture dealing with the manufacture of Viscose rayon, which was shown to the students by Messrs. Rose and Weber, of the Viscose Company, of New York City.

The film depicted the entire process of converting wood pulp into rayon yarns, from the cutting of the spruce timber to the grading, winding and shipping of the finished product. The principal steps were pointed out by means of an animated diagram which formed part of the picture.

DU PONT QUINOLINE YELLOW CONC.

The dyestuffs department of E. I. du Pont de Nemours & Co. announces that it is placing on the market Du Pont Quinoline Yellow Conc., an acid color of very green and bright shade. It is described as exceedingly level dyeing, and is extensively used as a self-color. It may also be used with blues and greens for producing very bright greens. According to the description, it is not affected by Sulphoxite CL and can be used for producing color discharges both on wool and silk.

Dyes Imported Through New York and Other Ports During November

Compiled by the Chemical Division of the Bureau of Foreign and Domestic Commerce in Collaboration with the Chemical Division of the United States Tariff Commission

KEY TO ABBREVIATIONS OF MANUFACTURERS' NAMES

1—THE SIX LEADING GERMAN COMPANIES

IG—Interessen-Gemeinschaft der Farbenindustrie.
A—Actien-Gesellschaft fur Anilin-Fabrikation, Berlin. Founded 1873.
B—Badische Anilin-und-Soda-Fabrik, Ludwigshafen-on-the-Rhine. Founded 1865.
By—Farbenfabriken, vormals Friedr. Bayer & Co., Leverkusen-on-the-Rhine. Founded 1862.
C—Leopold Cassella & Co., Frankfort-on-the-Main. Founded 1870.
K—Kalle & Co., A. G., Biebrich-on-the-Rhine. Founded 1870.
M—Farbwerke, vormals Meister Lucius & Bruning, Hochst-on-the-Main. Founded 1862.

2—THE SMALLER GERMAN COMPANIES

BK—Leipziger Anilinfabrik Boyer & Kegel, Furstenberg, near Leipzig. Founded 1882.
CG—Chemikaliewerk Griesheim G. m. b. H., Griesheim-on-the-Main. Founded 1882.
CJ—Carl Jager G. m. b. H., Anilinfarbenfabrik, Dusseldorf. Founded 1823.
GrE—Chemische Fabrik Griesheim-Electron, Offenbach-on-the-Main. Founded 1842.
L—Farbwerk Mulheim, vormals A. Leonhardt & Co., Mulheim-on-the-Main. Founded 1879.
Seig.—G. Seigle Corporation, Stuttgart.
tM—Chemische Fabriken, vormals Weiler ter Meer, Uerdingen-on-the-Rhine. Founded 1877.
WD—Wulfing, Dahl & Co., A. G. Barmen. Founded 1842.

3—SWISS COMPANIES (ALL AT BASEL)

DH—Farbwerke vormals L. Durand, Huguenin & Co. Founded 1871.
G—Anilinfarben-und Extract-Fabriken, vormals Joh. Rud. Geigy. Founded 1764.
I—Gesellschaft fur chemische Industrie. Founded 1885.
S—Chemische Fabrik, vormals Sandoz & Co. Founded 1887.

4—DUTCH AND FRENCH COMPANIES

FA—Farbwerk Ammersfoort, Ammersfoort, Netherlands. Founded 1888.
NF—Niederlandische Farben-und-Chemikalienfabrik Delft, Delft, Netherlands. Founded 1897.
CX—Compagnie Nationale de Matieres Colorantes et Produits Chimiques. Founded 1917. (Etablissements Kuhlmann merged with this company in 1923.)
P—Societe Anonyme des Matieres Colorantes et Produits Chimiques St. Denis (formerly A. Poirrier). Founded 1830.

5—ENGLISH COMPANIES

Bro—Brotherton & Co., Ltd., City Chambers, Leeds.
BAC—British Alizarine Co., Ltd., Manchester.
BD—British Dyestuffs Corporation, Ltd., London.
Cl Co.—The Clayton Aniline Co., Ltd., Clayton, Manchester.
CV—The Colne Vale Dye & Chemical Co., Ltd., Milnsbridge, Huddersfield.
Hol—L. B. Holliday & Co., Ltd., Huddersfield
Scot—Scottish Dyes, Ltd., Grangemouth.

FOREIGN dyes imported through the Port of New York and other ports during the month of November reached a total of 409,223 pounds, with an invoice value of $341,573. This was somewhat less in quantity than the total for the preceding month, but represented, in both quantity and value, the second largest month this year. Detailed import figures follow:

Imports of Synthetic Dyes

1927—	Pounds	Invoice Value
January	196,620	$186,387
February	312,277	262,364
March	404,714	352,414
April	402,783	323,732
May	349,476	265,752
June	318,450	253,054
July	263,162	214,853
August	401,122	339,269
September	396,432	325,338
October	417,626	313,122
November	409,223	341,573
Total (eleven months)	3,871,885	$3,177,858

1926—		
January	300,441	$283,635
February	369,045	377,638
March	487,804	435,891
April	437,526	401,606
May	392,739	343,745
June	333,319	317,896
July	351,425	303,079
August	380,414	298,159
September	387,533	322,446
October	460,351	406,167
November	383,142	327,164
Total (eleven months)	4,283,739	$3,817,426

Dyes and Intermediates Remaining in Bonded Customs Warehouse

	Dyes and Colors (pounds)	Intermediates (pounds)
June 30, 1927	1,003,847	866,105
July 31, 1927	925,569	844,058
August 31, 1927	887,447	876,786
September 30, 1927	705,885	808,560

Warehouse figures as of October 31 are not available, but will be published in the next issue.

Per Cent of Dyes by Country of Shipment

	Nov. 1927	Nov. 1926	Jan.-Nov. 1927	Jan.-Nov. 1926
Germany	56.0	50.0	56.95	49.64
Switzerland	31.0	28.0	26.34	33.55
France	3.5	4.0	3.19	3.74
England	1.0	4.0	3.79	3.94
Belgium	3.0	7.0	5.01	4.27
Canada	1.0	5.0	2.30	2.82
Italy	3.5	2.0	2.20	1.73
Netherlands	1.0	—	0.22	0.31

Five Leading Dyes, by Quantity, Imported During November

	Pounds
Erioglaucine	14,329
Alizarine, Synthetic	14,009
Helindone Printing Black RD Paste	12,500
Vat Brown R (single strength)	10,764
Brilliant Indigo 4B (single strength)	8,600

The dyes in this report are grouped by both Colour Index and Schultz numbers, and, in the case of those which could not be identified by either number, the classification according to the ordinary method of application was adopted. As the pastes and powders of the vat dyes vary widely in strength and quantity, each vat dye has been reduced—in nearly every case—to a single-strength basis.

DYES OF COAL-TAR ORIGIN

Col. Index No.	Schultz No.	Name of Dye and Mfr.	Quantity (pounds)
32	182	Brilliant Sulphon Red 5B—(S)	500
54	64	Sorrel Red X—(IG)	300
70	—	Rapid Fast Red GL Paste—(IG)	3,500
104	—	Metachrome Olive Brown G—(IG)	300
128	119	Diamine Rose BD—(IG)	100
130	121	Erika B Extra—(IG)	50
131	122	Cotton Pink GN—(IG)	100
173	—	Metachrome Violet B—(IG)	500
196	175	Acid Ponceau E—(G)	110
219	—	Eriochrome Flavine A Conc.—(G)	2,204
236	222	Yellow JR (Janus Yellow R)—(IG)	25
256	230	Cloth Red 3G Extra—(IG)	100
288	256	Sulphon Cyanine G—(IG)	500
292	260	Eriochrome Verdone S—(G)	551
307	265	Acid Milling Black B—(G)	6,614
319	—	Benzo Fast Heliotrope 2RL—(IG) Brilliant Benzo Fast Violet BL—(IG) Chlorazol Fast Helio BK—(BDC)	680
321	—	Diamine Fast Scarlet GG—(IG)	100
324	—	Diazo Brilliant Scarlet ROA Extra—(IG)	500
325	—	Brilliant Benzo Violet B—(IG) Diamine Fast Violet FFBN—(IG)	500
326	279	Benzo Fast Scarlet 8BS—(IG)	100
346	296	Cotton Yellow GX Extra—(IG)	300
368	306	Ignamine Orange 3G—(IG)	300
382	319	Chloramine Red B, 3B—(S)	6,000
403	—	Diphenyl Fast Gray BC—(G)	331
409	339	Diamine Orange B—(IG) Diamine Orange B—(C)	1,541
436	358	Chloramine Brilliant Red 8B Conc.—(S) Toluylene Red—(IG)	1,599
440	360	Ignamine Orange R—(IG)	150
448	363	Cotton Red 4BXA—(IG)	335
449	364	Diazo Brilliant Black B—(IG)	441
459	373	Congo Orange R—(IG) Diamine Orange F—(IG)	850
487	400	Brilliant Milling Red R—(IG)	300
577	457	Trisulphon Brown 2G Conc.—(S)	3,000
595	—	Diazo Olive G—(IG)	200
597	—	Cupranil Brown R—(I)	661
622	10	Stilbene Yellow 3GX—(IG)	100
629	207	Diphenyl Fast Brown GF—(G)	1,102
632	18	Diphenyl Fast Yellow RL Supra—(G)	35
636	19	Fast Light Yellow 3G—(IG)	700
642	—	Polar Yellow 5G Conc.—(G)	551
645	—	Kiton Fast Yellow 3G—(I)	551
649	26	Triazogene Orange R Powder—(IG)	200
655	—	Pyrazol Orange G Conc.—(S)	2,000
658	496	Basic Blue 6G—(By) Setoglaucine Conc.—(G)	663
663	500	Setocyanine—(G) Setopaline Conc.—(G)	440
667	503	Benzyl Green B—(I) Poseidon Green SGX—(IG)	1,101
671	505	Erioglaucine AP—(G) Erioglaucine EP—(G) Erioglaucine X High Conc.—(G)	14,329
676	511	Pararosaniline Base—(IG)	5,000
677	512	Magenta AB Powder—(IG)	1,000
680	515	Methyl Violet NFB—(IG)	1,120
681	516	Crystal Violet Extra—(IG)	1,400
682	518	Ethyl Violet—(IG)	1,000
696	528	Kiton Fast Violet 10B—(I)	230
698	530	Acid Violet 6B Conc.—(DH)	22
702	534	Acid Violet 7B Conc.—(IG)	50
706	538	Methyl Lyons Blue—(G)	1,102
707	539	Soluble Blue 5R Extra Conc.—(IG) Soluble Blue T—(IG)	200
710	541	Brilliant Sky Blue 5G—(IG) Direct Brilliant Blue 8B—(I)	320
712	543	Patent Blue V—(IG)	1,000
714	545	Kiton Blue A—(I) Patent Blue A—(IG) Poseidon Blue BR Conc.—(IG)	2,901
715	546	Blue FF—(IG) Blue Extra—(C) Cyanol Extra—(C)	2,900
717	548	Acid Violet 6BNOO—(IG)	200
720	551	Eriochrome Azurol BC—(G)	6,615
721	552	Chromal Blue GC for Printing—(G)	331
722	553	Eriochrome Cyanine RC—(G)	1,102
723	554	Chrome Azurol S Conc.—(G)	551
729	559	Basic Pure Blue BO—(B) Victoria Pure Blue BO—(IG)	1,651
733	562	Fast Acid Blue B—(By) Intensive Blue B—(IG) Intensive Blue B—(By)	296
735	564	Alkali Fast Green 3G—(IG) Naphthalene Green NV—(CN) Poseidon Green VGGX—(IG)	2,202
748	579	Sulpho Rhodamine B Extra—(IG)	200
749	573	Rhodamine B Extra (s. s.)—(IG) Rhodamine B Extra (s. s.)—(Q)	4,320
750	572	Rhodamine G Extra (s. s.)—(I)	550
752	571	Rhodamine 6G Extra (s. s.)—(IG)	500

Col. Index No.	Schultz No.	Name of Dye and Mfr.	Quantity (pounds)
758	582	Fast Acid Violet R—(IG)	50
762	—	Chromorhodine BN—(DH)	440
768	587	Eosine Extra f. f. s.—(IG)	50
786	—	Auracine G—(G)	110
787	—	Coriphosphine OX Extra—(IG)	300
788	603	Rhoduline Orange NO—(IG)	200
793	605	Cannelle AL—(IG)	
		Phosphine O—(IG)	825
795	607	Runic AL Conc.—(IG)	1,000
797	608	Patent Phosphine RRDX—(IG)	1,500
800	612	Quinoline Yellow Base (spirit soluble)—(I)	110
801	613	Quinoline Yellow—(I)	
		Quinoline Yellow Extra—(IG)	210
815	618	Basic Yellow T—(IG)	
		Rhoduline Yellow 6G—(IG)	650
833	—	Acid Blue AM Powder—(By)	
		Wool Fast Blue BL—(By)	
		Wool Fast Violet B—(IG)	1,041
875	923	Fur Gray ALA—(IG)	
		Fur Olive 3G—(IG)	225
878	622	Brilliant Delphine Blue B—(S)	1,000
879	—	Chromazurine E, G—(DH)	
		Chromazurine G—(I)	881
884	627	Chromacetine Blue S Extra—(DH)	441
892	635	Modern Violet—(DH)	220
894	637	Gallamine Blue Extra Paste—(G)	3,042
905	645	Gallazine No. 90—(DH)	441
909	649	Meldola's Blue 3R Conc.—(S)	1,000
913	653	Danubia Blue BX—(IG)	500
922	659	Methylene Blue B Conc.—(IG)	25
926	661	Thionine Blue GC—(IG)	100
927	663	New Methylene Blue N—(IG)	1,750
969	748	Hydron Blue R Powder (s. s.)—(IG)	1,667
971	748	Hydron Blue G Powder (s. s.)—(IG)	333
1027	778	Alizarine VI Old Paste—(IG)	
		Alizarine VI Extra Pure—(IG)	
		Alizarine Paste Bluish—(I)	14,009
1034	780	Alizarine Red S Powder—(B)	1,320
1035	782	Anthracene Brown SW Powder—(IG)	200
1040	784	Alizarine Red SX Paste—(IG)	1,323
1054	858	Alizarine Light Blue B Conc.—(S)	7,782
1060	801	Anthracene Blue SWG Powder—(IG)	500
1063	790	Anthracene Blue SWR Powder—(IG)	300
1064	—	Alizarine Cyclamine R Paste—(IG)	1,985
1067	804	Alizarine Blue S Powder—(IG)	500
1073	852	Alizarine Direct Violet ER Powder—(IG)	
		Alizarine Irisol R Powder—(IG)	336
1075	856	Alizarine Blue AS Powder—(By)	660
1077	860	Alizarine Direct Blue BGAOO—(IG)	1,225
1082	863	Anthraquinone Blue Green—(B)	26
1084	854	Alizarine Viridine FF Paste—(IG)	
		Alizarine Viridine FF Powder (s. s.)—(By)	4,229
1085	862	Alizarine Blue Black B Powder—(IG)	300
1088	855	Alizarine Sky Blue B Powder—(By)	551
1091	—	Alizarine Rubine GW Powder—(By)	191
1095	759	Anthra Yellow GC Paste—(B)	
		Anthra Yellow GC Paste—(IG)	
		Anthra Yellow GC Powder (s. s.)—(B)	
		Anthra Yellow GC Powder (s. s.)—(IG)	
		Vat Yellow GC Paste—(B)	
		Vat Yellow GC Double Paste—(B)	7,960
1096	760	Cibanone Golden Orange G Double Paste (s. s.)—(I)	220
1097	761	Vat Orange RRT Paste—(B)	
		Vat Orange RRT Paste Fine—(IG)	5 834
1099	763	Vat Dark Blue BO Paste—(IG)	
		Vat Dark Blue BOA Paste—(B)	
		Vat Dark Blue BOA Paste Fine—(IG)	2,088
1102	765	Vat Black BB Double Paste (s. s.)—(B)	1,462
1106	838	Vat Blue RS Double Paste Fine (s. s.)—(IG)	
		Vat Blue RSP Triple Powder (s. s.)—(IG)	1,500
1108	839	Vat Blue RK Paste—(IG)	100
1109	840	Vat Blue 3G Powder (s. s.)—(B)	220
1111	844	Vat Blue 5G Powder (s. s.)—(IG)	400
1113	842	Vat Blue GCD Dbl. Pst. Fine (s. s.)—(IG)	4,936
1115	843	Cibanone Blue G Paste—(I)	
		Cibanone Blue G Powder (s. s.)—(I)	1,651
1116	847	Vat Green BB Powder (s. s.)—(IG)	800
1118	849	Vat Yellow G Double Paste (s. s.)—(IG)	
		Vat Yellow G Dbl. Paste Fine (s. s.)—(IG)	4,898
1123	848	Anthra Gray B Powder (s. s.)—(IG)	400
1133	819	Algol Red R Extra Powder (s. s.)—(IG)	
		Vat Red FF Paste—(By)	2,987
1135	820	Vat Brilliant Violet RK Paste—(IG)	700
1142	830	Anthra Red RT Powder (s. s.)—(B)	880
1145	834	Vat Gray GK Paste—(IG)	400
1150	833	Grelanone Olive B Powder (s. s.)—(GrE)	
		Vat Olive R Paste—(IG)	
		Vat Olive R Powder (s. s.)—(IG)	8,258
1151	—	Grelanone Brown RR Paste—(GrE)	
		Grelanone Brown RR Powder (s. s.)—(GrE)	
		Vat Brown R Paste—(By)	
		Vat Brown R Powder (s. s.)—(IG)	
		Vat Brown R Powder (s. s.)—(By)	10.764
1152	—	Vat Brown G Paste—(By)	
		Vat Brown G Paste—(IG)	
		Vat Brown G Powder (s. s.)—(By)	4,053
1155	825	Algol Red B Paste—(IG)	794
1161	871	Vat Red Violet RRK Paste Fine—(IG)	600
1162	831	Vat Red RK Paste Fine—(IG)	
		Vat Red RK Powder (s. s.)—(IG)	3,341
1163	832	Vat Violet BN Paste—(IG)	
		Vat Violet BN Powder (s. s.)—(IG)	2,544
1171	868	Cibanone Brown B Powder (s. s.)—(I)	500
1172	—	Cibanone Black 2G Paste—(I)	110
1174	—	Cibanone Green B Powder (s. s.)—(I)	1,100
1175	—	Cibanone Olive R Powder (s. s.)—(I)	1,100
1184	881	Brilliant Indigo 4B Paste Fine—(IG)	
		Brilliant Indigo 4B Powder (s. s.)—(IG)	8,600
1188	884	Brilliant Indigo BB Paste—(IG)	1,012
1189	887	Brilliant Indigo 4G Paste Fine—(IG)	1,000
1190	885	Brilliant Indigo B Paste—(IG)	2,439
1196	890	Ciba Yellow G Paste—(I)	551
1207	912	Anthra Red B Paste Fine—(IG)	500
1211	910	Helindone Pink AN, BN Paste—(IG)	
		Helindone Pink BN Powder (s. s.)—(IG)	2,000
1212	918	Vat Red Violet RH Paste Fine—(IG)	2,500
1217	913	Helindone Orange R Paste—(IG)	
		Hydron Orange RF Paste—(IG)	2,900
1218	915	Vat Scarlet R Paste—(IG)	1,000
1227	904	Helindone Brown G Paste—(IG)	250
1228	907	Anthra Scarlet 2G Paste—(B)	2,314
1247	—	Natural Indigo	1,092

UNIDENTIFIED DYES

Acid Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Acid Brown RN—(G)	220
Acid Pure Blue BR Supra—(G)	55

(Continued on page 25)

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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SEVENTH ANNUAL MEETING

SATURDAY MORNING SESSION

December 3, 1927

[*Note—A portion of the Proceedings of the Saturday Morning Session of the Seventh Annual Meeting was published in the issue of December 26. The remainder follows, opening with the paper by Prof. Charles E. Mullin.*]

Prof. Chas. E. Mullin—I don't know just who selected this title for my paper. I do wish to point out, however, that it applies not only to wool, but to many scouring problems in connection with silk and cotton. Really, the paper constitutes, as you will soon see, a series of notes along various phases of the scouring industry.

. . . Professor Mullin then presented his prepared paper:

Some Notes on Detergents

By Chas. E. Mullin, M.Sc., F.A.I.C., F.T.I.
Professor Textile Chemistry and Dyeing, Clemson College, S. C.

Detergent problems are fundamental to the whole textile industry, and, along with a lot of others, have been since time immemorial. Yet we hear comparatively little about them in relation to their importance both directly and indirectly. For all their venerable age and importance, we have as yet no complete and accepted theory regarding detergent action or any really accurate and scientific method of estimating the value of a given detergent, or combination of detergents and assistants for any cleansing operation. By detergents I particularly refer to soap, and by assistants I mean the usual alkalies employed in connection with soap.

The best and at present most widely accepted hypothesis explaining the detergent action of soap and the ordinary assistants is that covering the surface tension lowering and emulsifying properties of these reagents in aqueous solutions. This hypothesis explains both the wetting-out and the emulsification of both liquid and solid dirt, but apparently it does not tell the whole story. This is indicated by the fact that it is impossible to accurately evaluate a detergent solution by a determination of its surface tension and for emulsifying properties. While these tests are of considerable interest and value in the evaluation of certain reagents, especially for special operations, they cannot as yet wholly supplement actual mill

tests for detergents. Yet it is frequently almost impossible to get an accurate mill test upon detergents in actual use due to the unavoidable introduction of numerous variables into most plant operations.

Most investigators have endeavored to evaluate detergent solutions by measurement of only one of the above properties, that is, either the surface tension or the emulsifying value. Undoubtedly both of these properties enter largely into most, if not all, cleansing operations with aqueous soap solutions, but there does not appear to be any reason to believe that they assume the same relative value to each other in every case. Very probably the extent to which each influences the cleansing efficiency and power of the detergent solution varies widely with the character of the material to be cleansed, the dirt, temperature, etc. Apparently no effort has as yet been made to correlate these separate actions and establish a factor between them even under experimental conditions in the simplest detergent solution and a single variety of dirt.

Also, as previously mentioned, it appears probable that some action other than the lowering of surface tension and emulsification may be necessary to fully explain the detergent action of soap and its assistants. Thus, the lowering of the surface tension of water and the emulsification of dirt by aqueous soap solutions is usually attributed to soap in the colloidal state. It is true that in the aqueous emulsification of either liquids or solids colloidal material is necessary, but a wide latitude of emulsifying material is permissible, and many of these emulsifying agents have no cleansing value. For example, the use of the metallic soaps as emulsifiers in aqueous solutions

In the same way solutions of low surface tension frequently have little cleansing value. For example, water has a surface tension at 20 deg. Cent. of 72.8 dynes, saturated aqueous sodium oleate solution 25 dynes, and ethyl alcohol 21.7 dynes. Yet the alcohol has almost no cleansing action upon material soiled with solid dirt. Sodium chloride forms a colloidal solution in alcohol, in the same way as soap in water, yet it does not assist the cleansing action of alcohol noticeably, even against mineral oils. Yet here we have a solution of very low surface tension containing colloidal material, and which will emulsify to some extent.

Hydrogen Ion Concentration

A very simple but important factor in connection with all detergent problems, but which appears to be much neglected by many workers along this line, is the hydrogen ion concentration of the detergent solution. The effect of adding alkali to a soap solution is well known to all of you and the effect of the total alkali concentration upon the surface tension of aqueous soap solutions has been studied. More recent investigators have studied the relation of the hydrogen ion concentration to the surface tension of the soap solution and some of them believe it to be almost proportional. That is, for solutions containing a unit quantity of soap, on plotting a graph wherein the pH is the ordinate and the surface tension of the solution the abscissa, the result is almost a straight line. These results are further supported by comparison of the curves obtained on plotting the pH of alkaline solutions against the total alkali concentration; and the surface tension of an aqueous soap solution against the total alkali concentration. The resulting curves are very similar, except that they are reversed. That is, as the total concentration of alkali increases, the pH increases more and more slowly, and the surface tension of the soap solution decreases more and more slowly.

While it is undoubtedly the soap in colloidal solution which controls the emulsifying properties of the soap solution, the above indicates that the soap in true solution may be a big factor in controlling the surface tension. It is true that as the pH of the aqueous soap solution increases, the amount of soap in colloidal solution, as well as the size of the soap aggregate, also probably increases. However, sodium chloride would cause this latter change to some extent without lowering the surface tension of the soap solution.

Lasting Properties

Another very important factor in the evaluation of soaps for use in the mill, but one which appears to be almost entirely neglected by most investigators, is the "lasting qualities" of the detergent solution. By this is meant the total amount of material which may be cleansed, or the amount of dirt which may be removed, before the detergent solution ceases to function properly and needs either reinforcement or renewal. There may be some relation between the initial emulsifying power of an aqueous soap detergent solution and its lasting power, but if so it does not appear to have been demonstrated as yet. Obviously the lasting power of the soap is a considerable factor in scouring economy, and it is well recognized by mill men that certain soaps excel others in this respect.

In connection with the lasting power of soaps and continuous scouring operations, it is of interest to note that, as would be expected, the pH of the detergent solution does not alter appreciably at the "break," that is, when the detergent properties of the solution become exhausted and it ceases to cleanse properly. Those who are familiar with continuous scouring operations know just how suddenly this occurs, and apparently it is connected with an exhaustion of colloidal soap from the detergent bath, so that it ceases to emulsify the dirt present on the material. The addition of more soap (emulsifying agent) renders the bath active again. This appears to support the theory

that it is the soap in true solution which influences the surface tension of the solution.

The Optimum Soap Concentration

In reviewing the reported results of research upon the detergent action of soap in aqueous solution there is one particular factor which is of considerable practical interest to all mill men, and that is the matter of concentration. We frequently find, especially in laundry and mill practice, that some salesman will come along with a "trick" cleanser and cut the soap bill in half. Frequently the cleanser is not as tricky as the sales talk and very often the real secret of the whole thing is that considerably more soap was being used in the operation than was necessary. You will sometimes find that of two men working side by side upon the same goods, the one may be using 200 to 500 per cent more soap than the other and securing no better results.

As might be expected, all authorities do not exactly agree upon the optimum concentration of soap in detergent solutions, but considering the great diversity of methods, as well as the varieties of soap and conditions used in arriving at their results, they agree extremely well, and my own practical experience supports this result. The concensus of opinion appears to be that the optimum concentration of soap in aqueous solution for detergent purposes is less than 0.5 per cent, and in some cases it is probably only about a half of this concentration. On the basis of soap efficiency, probably a soap solution of about 0.1 per cent will rank highest. However, these figures will vary somewhat with the character of the soap fatty acids, the soap alkali, the temperature of the bath, the nature of the dirt, etc.

It should also be pointed out that the cheaper alkalies, such as soda ash, etc., appear to be able to replace a considerable part of the soap necessary to give the optimum concentration at a much lower total cost. Just how far this can be carried frequently depends upon a number of conditions aside from the soap itself. For example, the use of the alkalies to replace the soap will usually alter very considerably the hydrogen ion concentration of the bath and this in turn, in the case of wool and silk, must be controlled to some extent at least, in order to avoid injury to the fiber. In the case of undyed cotton materials we have considerably more freedom in the matter of pH. While, as mentioned previously, the surface tension of the soap solution decreases to some extent with increasing pH until the point of salting out of the soap is reached, the emulsifying properties of the detergent solution do not increase in the same manner and appear to exhibit a decided optimum pH range, as is true in the case of most other emulsification problems.

Practical Applications of Theory

Even though our detergent theory is not all that could be desired in every way, considerable progress and savings in the mill are possible along certain lines by the practical application of the theory in the mill. For example, in the testing of some of the new wetting-out agents, where these are used for their wetting-out properties only and not as true cleansing or scouring agents. Here the desired effect is probably almost entirely due to the lowering of the interfacial tension between the fiber and impurities present with it, and the aqueous solution. In some cases it may be at least partially due to the increased solubility of these impurities, such as oil, grease and wax, in the aqueous solution. In this case a very simple laboratory comparison of the time required to completely wet-out the goods gives a fairly reliable indication of the comparative value of different reagents and mixtures under consideration.

Where a real cleansing effect is necessary, it is much more difficult and frequently impossible to select the best and most economical detergent or combination of detergents and assistants by laboratory tests alone. However, where the dirt is of a fairly uniform variety, as in the case of most piece goods scouring, etc., it is frequently possible to determine some control factors whereby the efficiency of the mill scouring operation can be improved. For example, where oiled cotton is to be scoured, it is frequently possible, by means of suitable laboratory tests, to find the optimum pH range for the emulsification of the particular oil used upon the cotton, with the variety and concentration of soap considered best or most economical for this purpose at the temperature used in the mill.

Again in the case of woolen or worsted goods, the same laboratory tests may be made, but in this case the injurious effect of the alkali upon the wool must also be taken into consideration and may place a limit upon the economy factor. In this case, as well as in that of cotton and silk, where a mild alkali has been used, a considerable saving in the cost of alkali may be effected by substituting it at least in part with a stronger alkali. However, on wool and silk this should only be attempted where there is a strict control of the pH and temperature of the scouring liquor. It seems almost unnecessary to point out that a determination of the total alkali present in a detergent solution, as determined by titration, means absolutely nothing as far as detergent effect or fiber injury is concerned. The pH is the important factor in both cases.

In planning the above laboratory experiments it should be remembered that chemically pure reagents should not be used. The ordinary mill soaps, alkalies and water, with the mill grades of oils, and as far as possible the

same contaminating dirts, etc., should be present in the laboratory experiments as in the mill. For this reason it is frequently best to work with actual mill scouring liquors which have been in use for some time. These, in the case of cotton, contain some of the waxes and pectins from the fiber; and in the case of wool and silk, considerable protein material, which frequently very considerably alter the emulsifying properties of the solution.

Probably the most practical experimental results are obtained by selecting a scouring bath which has been initially charged with the desired amount of soap but alkali below the optimum, and which has been in use for some little time. On adding varying amounts of alkali to samples of this liquor in the laboratory, the optimum pH range for emulsification is readily found, and can be accurately determined by suitable potentiometric methods. The temperature and all other factors must be as near to those in the mill as possible, as each factor influences the result to some extent.

I fully realize that these are rather crude experiments, and that the results are not always all that could be desired, but in the present state of our incomplete understanding of detergent action, our whole theory is somewhat crude, and it is useless to conduct our experiments with accuracy beyond the point of practicability.

A slightly different phase of the subject which is of considerable practical interest is the control of the pH of detergent solutions based upon wool in any form in the mill. This may to some extent be demonstrated in the laboratory; for example, the differences in the color and feel of the wool with variations in the pH of the bath. Some of the principal factors, however, such as better shrinkages and more uniformity of product, are only noticeable in plant operations over a period of time. Some excellent results are obtainable by the very simple control of a few of these factors in the mill.

Briefly, then, I may say that while our present theory of detergent action is not wholly satisfactory in every way, and while we are not as yet able to evaluate detergents satisfactorily in the laboratory, we can, in many cases, determine in a practical way certain control factors which are of assistance in obtaining the best results and economy in the mill.

Discussion on Detergents

President Olney—While the whole subject of cotton bleaching, from the point of view of its chemistry, has been studied over a long period of time, the chemistry and physics of scouring have been greatly neglected until within recent years, and I am sure this paper of Professor Mullin's is of timely value. I think there should be a good discussion on this paper. We can allow six minutes or so for it.

Dr. W. M. Scott—Have you any data regarding the optimum pH for scouring efficiency; that is, the optimum scouring efficiency. You say that an addition of alkali gradually increases the scouring efficiency, but there is a limit to that, of course, even granted that you do take into account the effect on the fibers.

Prof. Mullin—The optimum pH will vary. There is no optimum pH for all scouring. That is, as a general operation. But, for instance, in your work on silk, probably you found an optimum pH that was applicable to degumming.* The surface tension lowering effect increases with increased pH, up to the salting out point of the soap. But where you have, for instance, a mineral oil like that used on cotton, it has a decided optimum pH range for emulsification. You can readily demonstrate this by taking a little soap solution and oil, putting them in a 4-ounce sample bottle, and shaking it up in a laboratory. You will find that when you pass a certain pH range, you won't get nearly as staple an emulsion as you will within that range.

In scouring wool, unless you are scouring a certain variety of wool, unless you are continuously scouring one variety, for example, an Australian lamb, or Cape wool, or some particular variety, it is pretty hard to arrive at a definite optimum pH range, because of the variable character of the wool grease and the materials that are present with it. For instance, some of the Cape wools are loaded with colloidal clay, and so on, and undoubtedly this colloidal clay is a big factor in stabilizing emulsions, etc.

You can determine the optimum pH for a certain variety of wool, a certain general type of wool, but you cannot, according to my experience, determine any one pH range for all scouring, or even for all wool scouring, where you are handling a wide variety of wools.

Take Australian lamb's wool—this grease is a wonderful emulsifier, in the presence of alkalies. But you have a grease that is very light in color, with a comparatively low melting point, and it is quite different from the grease that you get in a Cape wool, for instance, which is almost black, or very dark brown, and loaded with clay to such an extent that you can take the grease, put it in a test tube, and place it in a water bath for weeks, and it will hardly have a clear layer on the top, because there is so much clay and silica in it. So that there is no one pH range even for wool scouring that is applicable to all types of wool.

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*It might be pointed out that in silk scouring, where the sericin is acted upon chemically by the hot alkaline solution to form soap-like compound of the amino acids with the alkali present, the action may be quite different from that in the usual scouring bath upon cotton, where there is very little, if any, chemical action upon the fiber. Upon this basis, we might expect the "detergent" effect of the alkaline bath to increase with the pH, the limiting factor being the injury to the fibroin present.—C. E. M.

But take a plant where they oil their cotton. They generally use one particular type of oil. There you have an easier problem, as you are working with a fairly uniform type of oil.

Dr. Scott—How about for the removal of dirt, that is, for straight cleansing operations?

Prof. Mullin—Something like laundering, do you mean?

Dr. Scott—Yes.

Prof. Mullin—I have never gone into that. How far it can be carried, I don't know. The character of grease there, the character of the material to be emulsified, would vary quite widely. If you were handling quite greasy material, like butchers' aprons, and so forth, where the dirt is largely animal fats, I should think that you might be able to determine some pH factor. But you have another factor there also: that the higher your pH the more you tend to saponify those fatty materials and to convert them into soap right in the detergent bath. Laundering is a little out of my line.

A. A. Claflin—Isn't it true, Professor, that the optimum pH for wool scouring, for example, for emulsion would be far higher than the wool itself would stand? That is, the amount of pH that the fiber itself would stand, at the temperature of scouring, is fairly well defined as between 10.1 and 10.3, and for permanent emulsification or the emusifying power, that would be increased if you could carry a still higher pH.

Prof. Mullin—In the case of raw wool, yes. This can also be applied to scouring wool in piece goods, though, where you don't have so much wool fat present. That is, you may have some mineral oils, and so forth, although it is true that the pH is often higher than you can use on wool, that is, the optimum pH for the emulsification of the oil present is often higher than you can use on wool without injury. As pointed out, in the case of scouring undyed cotton, this is not usually the case.

There is one factor in this connection which although not entirely new appears to be neglected in a good many plants, and that is that you can use caustic soda to replace a lot of soda ash in wool scouring by very simple control of the pH, at a decided saving.

Dr. H. C. Chapin—Professor Mullin has given us a great deal to think about. These matters of pH, surface tension, interfacial tension, etc., are of immense importance to the industry, but as in all matters of theory we must know the whole story before we can draw definite practical conclusions. This requires time, patience, and considerable financial outlay before returns come in, but in the end it is worth it.

In this connection I was much interested in the remarks of Dr. Rose and Mr. Lustig last evening. To me, they mean that the textile industry is well provided with the type of man necessary to get immediate practical results, but that there is a deficiency of the type which is able and willing to concentrate on work of the sort suggested by Prof. Mullin's paper. May I suggest that this is due in no small measure to the failure of the management to recognize the value of such fundamental investment for the future, in its impatience for immediate results?

E. M. Shelton—To come back to the pH of soap, can you tell us what you have observed as the pH values for typical neutral soaps in, say, 1 or 2 per cent solution, and what relation there is between these pH values and what you speak of as the breaking point of the soap?

Prof. Mullin—I don't refer to the breaking point of the soap. I refer to the "break" in the scouring, which does not mean the breaking point of the soap.

Mr. Shelton—I should have said "breaking of the scouring."

Prof. Mullin—There is no relation whatever between the pH and the break. Some years ago, probably four or five, I was inclined to believe that in wool scouring, for instance, you could predict or foresee the break in scouring, due to a change in the pH. At that time we didn't have as many varieties of electrodes, and so on, as we have to-day, and I spent several months tinkering around trying to determine the pH of wool scouring liquors, highly contaminated, at the point where they were about to break, or after they had broken. At that time I was unable to get results. Several years later I was able to get results, and my work has absolutely proven to me that there is almost no change in pH at the break.

The accepted theory to-day is that it is the soap in colloidal solution which influences both the interfacial (or surface) tension and the emulsifying properties of the soap solution. This may be correct, but I believe that the soap in true solution also plays at least some part in the interfacial and surface tension. How large a factor it is on the interfacial tension, I don't know. But apparently it is the soap in colloidal solution which holds the dirt in the solution after its removal from the fabric, by forming a protective film or coating around it. This is in accord with the theory of emulsification.

There are so many little understood factors. Take the matter of the static charge upon the colloidal particles, aggregates, micellae, or whatever you prefer to call them. This charge may be an important factor in loosening the dirt from the material. Why and how is the dirt loosened from the material? Very probably the interfacial tension plays a part. Pedesis or Brownian movement may also play a part. The interfacial tension between the detergent solution and the fabric being less than that between the attached dirt and the fabric, the dirt is detached. But wherever there is a static charge, there is also present an induced and opposite charge upon other surrounding matter. These opposite charges attract. Do they assist in loosening the dirt particles from the goods? At least

they may serve a purpose in attracting the surrounding layer of colloidal emulsifier about the dirt particle, which either holds, or largely assists in holding, the dirt in an emulsified or suspended state in the solution. The pH of the solution controls the character and amount of the static charge upon the colloidal particles, both soap and dirt, present in it, and therefore the pH is again a large factor in controlling the detergent value of the solution.

I believe the break in scouring occurs when there is no more colloidal soap left to coat the particles of dirt. The free colloidal soap in the solution is exhausted. At the same time I have found that the wetting out or interfacial tension properties of the solution have not changed very greatly. The solution will wet out but it will not cleanse properly. The material comes out dirty. On that basis, you would not expect a change of pH to any decided extent at the break.

One thing that I did find which I have never had the time to investigate fully is that there seems to be a decided change in the conductivity of a soap solution just about the time of the break. According to Prof. McBain's theory, the conductivity of these soap micellae is a pretty involved matter, but we will agree with Prof. McPain that the exhaustion of colloidal aggregates of soap from the solution would considerably alter the conductivity of the detergent solution.

I wanted to investigate this considerably further, but it required a lot of apparatus that my client was not willing to invest in, so we dropped it at that point. However, I have never found more than one or two-tenths of a pH unit change when the soap solution broke in use.

To get to the pH of a so-called neutral soap solution. The pH will vary more or less according to the alkalies used in the soap and the fatty acid present, also the impurities present. Some soaps have considerable salt present. This will have some retarding action upon the ionization of the soap and give you a lower pH than if you had a chemically pure soap. In neutral commercial olive oil soaps, so-called, the pH, I have found, in most instances runs below about pH9.

You asked about 1 or 2 per cent. That is a pretty high soap concentration. I should say that with less than one-half of 1 per cent, or around that figure, you would generally have a pH of less than 9.

Mr. Shelton—I have never found any as low as 9 in a neutral soap. But I have measured most of them, a few in a quarter of 1 per cent, more of them in 1 per cent, but a number in as high as 10 per cent solutions, where the fatty acid was of a very low figure, and I have found that they are remarkably close together. That is, the buffer action of the soap is such that the pH doesn't vary much with concentration.

I was wondering, though, whether there was a relation between the pH value found and this breaking in scouring, and whether the breaking point in the scouring is what we might call the pH of a truly neutral soap molecule, without any hydrolysis, or with a minimum of hydrolysis and free alkali present. Did the conductivity increase or decrease at the break?

Prof. Mullin—I can't recall about the conductivity measurements. It is at least four or five years since I did that work, and we didn't make more than twenty-five or thirty conductivity determinations. This work was done at the Leeds and Northrup Research Laboratory. It was sort of an afterthought, when we were not able to get any results on the pH at the break. The behavior was rather erratic. As nearly as I can recall, the conductivity dropped and in some cases it was a rather decided change. In other cases, it was not so great.

By the way, my work on these solutions was practically all on commercial soaps. None of the soaps were what you might call C. P. soaps, and the work was all done in the presence of considerable alkali.

Most of my work has been done more with the idea of applying these theories or checking up and investigating some other man's work. My work was done with the idea of trying to carry some of these theories into the mill, and in most of my work I used anywhere from 5 to 25 times as much soda in the bath as soap.

Dr. H. C. Chapin—I am pretty sure your soda in there is the whole story, because I ran some pH tests on the first scouring bowl, and I don't believe they ran, any of them, over pH 8.5.

Prof. Mullin—That would correspond with what I said about the pH of soap running around pH 9.0 or less.

Dr. Chapin—There was some free alkali present.

Prof. Mullin—I have found detergent solutions of very high pH in use in mills where I would go and take an unexpected test. Of course, there would be plenty of alkali present. Very few people in scouring raw wool use only soap. They generally use plenty of alkali. Some of them use 20 to 50 times as much alkali as soap, and I have found that the pH runs as high as 13, or 13.5 in some cases.

Dr. Chapin—Just as soon as you put it into the scouring bowl, so much comes out of the wool that it utterly upsets your calculations on the pH of the soap alone.

Prof. Mullin—One thing which decidedly surprised me is that you can't dilute most wool scouring liquor after it has been in use for a long time. You would think that it would be buffered so highly that you could almost dilute it indefinitely without change of pH, but my experience is that you can't do it. If you dilute it, say only 2 parts of water to 1 part of scouring liquor, you change the pH. I have seen a thousand determinations a day run on pH's of scouring liquors for months at a time, and almost invariably even a slight dilution changes the pH to some extent.

ANNUAL BUSINESS MEETING

Election of Officers

President Olney—I am sorry to have to bring this interesting discussion to a close, but we have already passed the time for our Annual Business Meeting to begin.

In order to facilitate matters, I appointed Walter C. Durfee and Karl R. Moore as tellers in connection with the election of officers. The election of officers, as you know, is conducted by letter ballot, and we should like to hear at this time from the tellers.

Walter C. Durfee—There were 234 votes for Dr. Killheffer for President; 236 for W. S. Williams for Vice-President; 233 for Dr. Jos. F. X. Harold for Vice-President; 241 for Walter E. Hadley for Secretary; and 241 for Winthrop C. Durfee for Treasurer. For Councillors for three years, R. F. Culver received 237 votes; B. S. Phetteplace, 236.

There were a few scattered votes for President and Vice-President which I don't think it is necessary to read. There were only one or two.

President Olney—As my last official act as President of the Association, I declare these officers duly elected:

Dr. E. H. Killheffer, President.
W. S. Williams, Vice-President.
Joseph F. X. Harold, Vice-President.
Walter E. Hadley, Secretary.
Winthrop C. Durfee, Treasurer.
R. F. Culver, Council Member.
B. S. Phetteplace, Council Member.

President Killheffer, will you please step forward? (Applause.)

President Killheffer, it is with pleasure and confidence that the Association is in good hands that I turn over to you this gavel, and I can assure you that if you receive the hearty support of all the officers and members of the Association that has always been given to me, you will find this a very pleasant task. I think you will fill that chair very gracefully and efficiently. (Applause.)

. . . Dr. Killheffer assumed the chair as President.

President Killheffer—Gentlemen, all I wish to say at this particular moment is that I fully appreciate the very high honor that you have conferred on me in electing me President of your Association. I shall not try to make a set speech, but simply express the very deep appreciation that I do feel.

I have been more or less active in the Association since its formation, as you probably know, and it has always been a source of pleasure to work along with such men as our retiring President, Professor Olney, and the rest of the officers and members of the Association.

Needless to say, the President doesn't, by any means, make an association, but the efforts of all of the members and the other officers will either make or break the President. So I only regard this as an indication of your esteem, which I do appreciate very much, and I intend to give you the best that I can in my year as your President to further the good work that is now well under way.

Thank you very much. (Applause.)

The next order of business is the report of the Secretary.

Report of the Secretary

Submitted by WALTER E. HADLEY

The Council of the American Association of Textile Chemists and Colorists has held nine Council meetings, including one in Charlotte, N. C., since the last Annual Meeting in 1926.

The Research Committee has held seven meetings in Boston. For several months past, the Association has had in its employ a Research Associate, who is engaged in work outlined by the Research Committee, and at the present time he is working in collaboration with the Bureau of Standards.

The continued increase in Corporate Members shows a growing interest throughout the industry.

Six local sections and one junior section are doing excellent work.

During the year we have added eighty-nine Active Members, thirty-seven Junior Members, and five Corporate Members to our list. On account of non-payment of dues, ninety-eight names have been dropped, although an effort is to be made by special solicitations to reinstate as many of these members as possible. Thirteen Junior Members have been transferred to Active Membership. The total membership at the present time is 924 Active and Junior Members and seventeen Corporate Members.

Treasurer's Report for the Year 1927

Submitted by WINTHROP C. DURFEE

GENERAL FUND

Cash on hand November 10, 1926.....	$1,920.90

Receipts (General Fund)

Cash on hand November 10, 1926.....	$1,920.90
Dues	4,576.50
Corporate Membership	1,040.00
Year Book	55.00
Howes Publishing Company (refund).....	131.55
Journals	6 50
Emblems	31.50
Interest from American Trust Co., Boston...	109.32
	$7,871.27

Expenses (General Fund)

Administration	$1,455.98
Journals	2,533 13
Sections	350.00
	$4,339.11
Total Receipts, General Fund	$7,871 27
Total Expenses, General Fund	4,339.11
Balance, General Fund, November 10, 1927..	$3,532.16

RESEARCH FUND

Receipts (Research Fund)

Cash on hand, November 10, 1926	$2,749.78
Received from contributions, 1927 (This includes $500 from National Association of Wool Manufacturers)	959.00
	$3,708.78

Expenses (Research Fund)

Expenses for 1927, Research Fund	$899.23
Total Receipts, Research Fund	$3,708.78
Total Expenses, Research Fund (including $150 for prizes)	899.23
Balance, Research Fund, November 10, 1927.	$2,809.55

TOTAL BALANCE ON HAND, NOVEMBER 10, 1927

General Fund	$3,532.16
Research Fund	2,809.55
	$6,341.71

President Killheffer—The next order of business is the report of the Research Committee, which will be presented by Professor Olney.

Report of the Research Committee

Submitted by PROF. L. A. OLNEY, *Chairman.*

The report of the Research Committee up to July 1, 1927, was published in the 1927 Year Book, copies of which should have been received by every member several weeks ago. In this connection, I might say if you have not received your copy, we should like to have you communicate with the Secretary. For this reason I shall not take the time to go over the report, but I do wish to call your attention to several parts which I believe are of particular interest:

First, to the fact that a full-time Research Associate, William C. Smith, was engaged early last summer and that he has been working since that time at the Bureau of Standards, in co-operation with William D. Appel, chiefly upon the work of the Sub-Committee on Fastness to Washing. This is the first step toward the promotion of a rather comprehensive program which is being developed by the Research Committee. More will be said about this, however, at another time.

Second, to the progress which is being made in an endeavor to establish international standard methods of dye testing, and recording the same.

ESTABLISHING INTERNATIONAL STANDARDS

In March, 1925, a letter was forwarded to the British Society of Dyers and Colourists, expressing the desirability of formulating standard methods of dye testing which might be internationally recognized, and at the same time suggesting the possibility of a co-operative study of the whole subject. Our proposal was well received, and early in 1926 the British society organized a large committee of prominent textile chemists and colorists for the purpose of studying the whole subject of standard methods of dye testing. Copies of our methods have been forwarded to each member of this committee, inviting study and criticism. In Germany, a Fastness Committee has been actively engaged for a number of years in the study of dye fastness standards and methods of testing, and it has already published several valuable reports. Quite recently this committee expressed a desire to co-operate in the matter of international standards, and a similar expression of co-operative interest has been received from the Polish Commission on Standard Methods.

Since the publication of the report in the Year Book, assurance has been received that similar interests in France will lend their co-operation.

The establishment of international standards will undoubtedly require considerable time and involve many complications, but we believe the project is perfectly feasible, and the American Association of Textile Chemists and Colorists stands committed to assist in every possible way.

The Research Committee has from the start been familiar with the standard methods of the German Fastness Commission, and, from the time they were published, with those of the British Silk Research Association, and the British Research Association for the Woolen and Worsted Industries. Our intention has been to adopt the European methods and standards in so far as they are found adequate for our purposes. Conditions of use of dyed materials in this country are in a number of ways different from those in Europe, and we have had to study the European methods in the light of our conditions. As time goes on, however, we believe that European and American requirements will approach each other more closely.

The demand for goods of guaranteed fastness and the

increasing use of the faster dyes during recent years has called for more precise fastness classifications and more definite standards. The method employed by the German Commission and followed by the British Associations, of naming dyes to be applied in prescribed ways by the tester as standards, was a big advance in this respect. However, the Research Committee has found that such standards are not always dependable. To meet this situation, the committee has decided to provide dyed cloth representing the standard degrees of fastness. Thus all testers can make comparative tests against the same standards. This, we believe, is a decided step forward. In addition, the fastness claims will be defined more precisely than heretofore.

A Machine for Washing Tests

Another real contribution to the subject which has been made by the Research Committee is the development of a machine for testing fastness to washing. This machine should replace the open beaker test, which did not duplicate the mechanical action of either commercial or home laundering.

For the benefit of those who are following the work of the committee, it should be pointed out that the various tentative tests for fastness to washing published in the Year Book are to be entirely revised and rewritten. As a result of the study of the methods by ten typical laboratories, much more extensive work has been initiated on fastness to washing. Standard dyeings to be issued by the committee and a standard washing machine have already been decided on. A study of the relation between laboratory tests and practical laundering has been undertaken. Until this work is completed the new washing tests cannot be given.

Emphasis should be laid on the fact that all of the Research Committee's tests are being established on an unassailable experimental basis.

With reference to the often-raised question as to whether fastness classes should be numbered 1, 2 and 3, beginning with the fastness class or beginning with the most fugitive class, we are of the opinion that the matter is of little importance. The important question is whether each fastness class is clearly defined and related to the practical conditions of use.

The Research Committee is always open to suggestions in regard to its work. We wish to plan our work and investigations, and execute them in such a way that the results will be of definite value to the members of the Association and the textile and color industries which it represents. The reports of the sub-committees will now be presented.

President Killheffer—I believe the Committee on Light Fastness has a report that can follow now. Mr. Cady!

. . . William H. Cady presented the prepared report of the Sub-Committee on Fastness to Light:

Report of the Sub-Committee on Light Fastness

Submitted by William H. Cady, *Chairman*

At the Sixth Annual Meeting held in Charlotte in December, 1926, a preliminary report of the investigation which your committee has been conducting at the Bureau of Standards, Washington, was made by William D. Appel, of the Bureau, who has been in charge of the work. We had hoped to publish the results of this research, which we call Series No. 4, during the present year, but nearly 1,000 of the exposures are still uncompleted (we do not attempt to carry on these sun tests during the winter), and even after the last color has faded to the necessary degree much work will remain to be done in examining, comparing, recording and tabulating the fading of about 9,000 separate dyed samples, each one of which, with few exceptions, will have been exposed for four distinct periods of time. From present indications it is probable that the last of the exposures will be completed by the end of next summer, and the final report should appear some time in the fall. This report will probably include a table of the relative fastness to light of all the dyes used in this series, numbering about 550; a recommendation of certain dyes, ranging from fast to fugitive, as suitable "standards" of fastness, on cotton, wool and silk, respectively; comments on the results obtained in the several sunlight tests (with and without glass, continuous and intermittent, north and south light, etc.); a recommendation of a standard procedure for making sun exposures; and a critical comparison of the Fadeometer or Violet Carbon Arc with the sun as a source of light for fading tests.

We desire to refer you to the report of this committee published in the Proceedings in the American Dyestuff Reporter, November 14, 1927, giving complete details of an earlier investigation carried on in part at the Bureau of Standards and in part at various points on this continent from Quebec to Georgia and California. These experiments are collectively referred to as Series No. 3, and have been in progress for over two years but are now practically at an end, though we still occasionally make use of the dyed samples of this series for comparing fading conditions in different localities or testing new fading devices. For example, we have just received a set which was exposed in the "Fugitometer," a British modification of the "Fadeometer," and further developments along this line may be expected. In a sense Series No. 3 may be regarded

as preliminary to Series No. 4, but some of the results as published are, we believe, of considerable value in themselves, and we commend the report to all who are interested in the light fastness of dyes, and would welcome a discussion of it at this or any other time. We regret that an unfortunate error on page 711 has rendered two tables of figures quite meaningless; these two tables have been rewritten and will be distributed at an early date. Fortunately, the error was discovered in time so that in the reprints of this report, which are being prepared for general distribution, the tables will be correct.

Following the speaker, Mr. Appel will give a preliminary account of another investigation which he and our Research Associate, William C. Smith, have been conducting at the Bureau, known as Series No. 5, in which the behavior of a number of dyes when exposed under different kinds of glass has been studied. The complete report of this work will be published in a few weeks.

Still another separate research, Series No. 6, is under way at the Bureau at the present time. An attempt is being made to measure, more accurately than ever before, the effect on fading of variations in the following factors: (1) The intensity of the light; (2) the degree of humidity of the air; (3) the temperature. All of these variables are known to have an influence on fading, and some dyes are known to be more susceptible to these influences than others; but so far as we are aware, this is the first time that a serious quantitative study has been made of these particular phenomena. The results we hope to be able to publish before spring.

In closing, we are glad to refer to the scientific investigations which are being conducted in England along somewhat similar lines by the British Research Association for the Woollen and Worsted Industries, and which are being published from time to time in the Journal of the Textile Institute and the Journal of the Society of Dyers and Colourists. We would also call your attention to the report of the German Fastness Commission, which has been translated into English and published in three consecutive issues of the American Dyestuff Reporter commencing October 3, 1927. Another report of much interest is that of the British Silk Research Association, published in the Journal of the Society of Dyers and Colourists in October, 1926, giving standard methods for testing the fastness of dyes on silk. All this activity in different parts of the world, aimed at the same problem, is very encouraging, and while perhaps it is a little early to look for an international code of fastness quite yet, we are certainly headed in that direction.

President Kilheffer—Before any comments or discussions are asked for on this report, I think we had better have the further elaboration of the report by Mr. Appel.

Fading Tests of the Sub-Committee on Light Fastness

Report Submitted by WILLIAM D. APPEL

What I have to say now concerns the work of the Sub-Committee on Light Fastness and represents the first results of your Research Associate at the Bureau of Standards, William C. Smith. The Society is to be congratulated on the selection of Mr. Smith, whom I should like to introduce at this time. William C. Smith! (Applause.)

One of the results of the earlier experiments of the Sub-Committee on Fastness to Light was the recommendation of a particular sunlight exposure test for adoption as the standard. During the past summer we undertook to find out whether ordinary window glass is a suitable material for covering the exposure boxes in this standard test, or whether some special glass, such as Vita or Corex, is required. At the same time, it has been possible to study in a more general way the effectiveness of different parts of the solar spectrum for fading dyed textiles.

In brief, the experiments consisted of the exposure to sunlight of identical sets of twenty selected dyeings without glass cover, under Corex glass, Vita glass and window glass, and under other glasses having suitably chosen spectral transmissions. Intercomparison of the samples then showed the effect of light transmitted by the glasses. The differences in fading were not only judged visually, but were recorded quantitatively by spectral reflection measurements. It is believed that this will be the first report on fading tests in which the results are set forth in this way.

The transmissions of the glasses have been measured and the approximate spectral distribution of the light received by the samples in the standard test has been worked out from the best available solar energy measurements. All of this data, together with the exposed samples, will be placed on the table for your inspection. In view of the fact that the detailed report will be published in the very near future, little more need be said at this time.

I might explain these exposures. We have mounted on cards the several samples of the same dyeing exposed under the different glasses. Here we have no glass—Corex, Vita, window, and so on—exposures. If you will examine these samples you will see, for example, that one of the blues has faded from radiation in the visible part of the spectrum, whereas another blue has faded more particularly from radiation in the

ultraviolet part of the spectrum. Each dyeing is a law unto itself in that respect. It isn't only the ultraviolet light that is doing the fading. In some cases it is almost entirely the visible light.

Measurement of Reflection

Then we wanted in a more quantitative way to represent these fading changes, so we have measured the reflection (by a method which I will describe this afternoon) at 7 points in the spectrum of the undyed sample, represented by a solid curve on these figures, and of the longest exposure, represented by the dotted curve. We gave each one of these samples four exposures to light—a short exposure, one double that time, then one double that, and then another double that—so we could see how the sample faded with time. The sample has gone from the solid curve to the dotted curve in the longest exposure given under window glass.

Taking the point on the spectrum where the sample shows the most change in reflection, we have plotted the reflection values at this wave length for the fourth exposure, the longest exposure under all the other glasses, against time on a curve obtained for the sample exposed under window glass.

You may examine these at your leisure.

We also wanted to know fairly exactly what light was doing the fading, so we had to go back to the measurements of the distribution of energy in the solar spectrum at Washington, D. C., that have been made by the Smithsonian Institution, and to the measurements of the transmission of the atmosphere which cuts off some of that light. By that means we obtained a curve representing the average distribution of energy in sunlight at the earth's surface in Washington, D. C., on a clear day. But that is not the entire light which is doing the fading. Our samples were exposed to skylight as well as to direct sunlight.

So we had to turn to some measurements and calculations made by Dr. Kimball, of the Weather Bureau, from which we obtained a curve which represents average sunlight plus skylight on clear days in Washington on a surface sloping 45 degrees from the horizontal and facing to the south, and that is as near as we can come to the spectral distribution of the light causing this fading.

In addition to that, we have the transmission curves of the various glasses under which the samples were exposed, and by comparing these you can see just what we have to deal with.

This investigation has to do with the effect of the radiation in different parts of the spectrum on the fading of dyeings.

Thank you. (Applause.)

President Killheffer—If there are any comments that any of you would like to make or questions that you would like to ask in connection with the work of the Committee on Light Fastness, now is the proper time to bring them up. If there are no questions or remarks, we will pass to the next order of business.

We will have the report of the Sub-Committee on Washing. Mr. Christison, you have the Wool report, haven't you?

Reports of the Sub-Committee on Washing

Hugh Christison—The report on Wool is probably the least important of the washing tests. That on cotton, I think, is the most important.

Professor Olney has covered this subject very thoroughly and he said all that I intended to say. I can only emphasize what we think is the necessity for a machine instead of the beaker on manual testing.

The only other thing I can say is with reference to Mr. Appel's development of adding rubber cubes to the washing machine, and I wish Mr. Appel would describe that method. It certainly sounds good.

President Killheffer—Mr. Appel, will you please oblige again?

Construction of the Washing Machine

Mr. Appel—In a laboratory washing test, the most difficult thing to do is to reproduce the mechanical action to which goods are subjected in a commercial laundering machine, or in an electric machine at home, or on the scrubbing-board. All of the other conditions can be approximated very well, but the mechanical action is a difficult problem; where you have 100 pounds or more of clothes in a wash-wheel, you have that pounding and rubbing and scraping together.

This washing machine which Mr. Christison designed originally up at the Arlington Mills (and I designed a somewhat different one at the Bureau of Standards) consists simply of a shaft on which are mounted some Mason jars that can be rotated at a constant temperature. The sample in its washing solution falls from one end of the jar to the other, and a certain amount of mechanical action is thus given the sample.

The idea looked very good; because while Mr. Christison's machine and mine are quite different in construction, we got identical results as to the change in color in fabrics—that is, wool fabrics—on washing duplicate pieces in our machines. But just a few weeks ago we received at the Bureau a sample of artificially soiled cloth, "standard soiled cloth," from the Detergents Committee of the American Oil Chemists So-

ciety, whose work is to develop a method for determining the detergency values of various materials. The committee has printed cotton with these black stripes, using lampblack, some mineral oil, gums and so forth. This particular material may be washed white in five commercial launderings made according to the Laundryowners' National Association's method for laundering the very dirty bundle.

We tried to wash this cloth in our laboratory washing machine, a very small piece of material 1½ by 4 inches being used. The stripes did not entirely disappear in a wash which corresponded to five commercial launderings. It was clear to us that we had to get more mechanical action in some way, and we did it by placing one-centimeter rubber cubes in the jar with the soiled cloth. We used a rubber especially made up which had a specific gravity of about 3, a very heavy rubber. With the rubber cubes in the jar, a wash that corresponded very closely to that of the five commercial launderings gave us a practically white piece of cloth.

I believe we have that problem licked. We can get the mechanical action on a few square inches of cloth which simulates that obtained in the commercial laundry. I have a photograph of our washing machine and one of Mr. Christison's machine which I will put on the table for your examination later.

President Killheffer—Those of you who are interested in the subject of making washing tests on any fabric will get something of value if you will look at those photographs, because the machine is a simple one (simple in its construction) and yet, as Mr. Appel has pointed out, it is very efficient in action and it does give uniformity of results, which our laboratory methods, as everyone knows, did not.

We will now hear the report of the Sub-Committee on Washing Fastness of Cotton.

Fastness to Washing of Cotton

Submitted by G. A. Moran

There isn't much to report on the washing fastness of cotton, at this particular time, as practically nothing has been done during the past year.

In the season that has just passed, most of the efforts of the Research Assistant have been devoted to work on fastness to light. In the immediate future we expect that, with the availability of this Research Assistant, much more work can be done with regard to fastness to washing, and probably by the close of this coming season sufficient experimental data will be obtained so that any revisions that appear desirable can be made in the methods that have already been adopted.

It is also, of course, to be noted, as Dr. Olney remarked, that co-operative efforts are being conducted in foreign countries along the same line. So that probably by next fall we will have fairly complete information and a revised report from the one we have at the present time.

President Killheffer—Is the Sub-Committee on Washing Fastness of Silk ready to report?

Report of Sub-Committee on Fastness to Washing of Silk

Submitted by Dr. Walter M. Scott, *Chairman.*

The Sub-Committee on Fastness to Washing of Silk hasn't very much to add to the reports of the other subcommittees and also Professor Olney's report, in which he went into the matter of our proposed action quite in detail. However, it might be of interest at the present time to just give an idea of the line of attack which we are proposing to make on this problem with a view to making our methods a little more practicable.

The methods as they appear in the 1927 Year Book received, as far as I know, two major criticisms, when they were submitted to a large number of laboratories for actual demonstration. One criticism was that there were too many tests involved, there being four tests listed. Another criticism was the difficulty of classification from these tests on the basis of the definitions which were printed.

We believe that both of these objections can be very easily met by the adoption of standards, which procedure the Research Committee has definitely decided upon. That is, if we have a standard, representative of each class, the necessity of classification from a definition is removed. It will simply mean that the unknown will be classified in a particular class, if it does not lose any more color in any of the tests than the standard which is listed in that particular class.

Then the question of the number of tests will be taken care of, because in most instances the approximate fastness of the sample to be tested is known. It is then only necessary to pick out one significant test from the four, which are described, and compare the unknown against the standards in that particular test to see which of them it most closely resembles. Usually one test should be sufficient to definitely classify the unknown, but where there is any reasonable doubt, another test could be made as a check.

On silk we have progressed far enough so that we feel the standards which were listed in the 1927 Year Book are satisfactory, with one possible exception. We have listed the standards as follows:

For Class 1—Indigo MLB4B Powder.
For Class 2—Zambesi Black V.
For Class 3—Formyl Violet S4B.
For Class 4—Patent Blue A.
For Class 5—Patent Blue V.

We find that all of those fall very naturally into their classes, with the exception of the Zambesi Black V. So our immediate efforts in the future are to be devoted to finding a better standard for our Class 2. We are also planning to correlate our methods of test with those of the other sub-committees, in that we are adopting the principle of the standard washing machine for making the test.

President Killheffer—Mr. Cady, will you report for the Committee on the Award of Prizes, there being four prizes to award, and the consideration being the papers of the greatest value presented before the Association or printed in the Proceedings of the Association during a period of one year.

Committee on Award of Prizes

Report by WILLIAM H. CADY

The committee examined all papers published between November 1, 1926, and October 31, 1927, and found a number of papers of considerable value. It was rather difficult to decide which were the most valuable, from the standpoint of the members of the Association. I use the term "most valuable," because that is the language used in the resolution adopted by the Council which authorized these awards. We finally decided that the following four papers were entitled to prizes:

First prize, $100, to Dr. R. E. Lee, for his paper, entitled "The Enzymes," read before a meeting of the New York Section, and published in the Proceedings, February 21, 1927.

Second prize, $75, to Dr. Robert E. Rose, for his paper, "Modern Theories of Dyeing," read at the last Annual Meeting, and published in the Proceedings, January 10, 1927.

Third prize, $50, to Dr. Berthold Wuth, for his paper, "The Chemical Constitution and Fastness Properties of Colors," read at the last Annual Meeting, and published in the Proceedings, January 10, 1927.

Fourth prize, $25, to Dr. C. S. Hollander, for his paper, "The Manufacture and Use of Hydrosulphites," read at a meeting in Providence, and published in the Proceedings, November 1, 1926. (Applause.)

President Killheffer—I might say that there were a great many more papers for consideration during the last year than there have been heretofore. Of course, the theory behind the offering of these prizes is the promotion of effort on the part of our members to present subjects which are of general interest before our various sectional meetings. There may be a certain amount of diffidence about presenting papers, but each member certainly has some subject on which he is pretty well versed, and that subject very likely will be of a great deal of interest, if he will just overcome his natural, or other, reluctance, and indicate a willingness to present the subject before some local section.

There was a committee appointed a short while ago in the Council to consider some revisions which seemed to be necessary, not revisions exactly, but amendments to the Constitution, which have to do, in the first place, with the qualifications for membership.

We have, as you know, rather strict qualifications for membership in the Association. Those qualifications were laid down originally because it was thought a wise thing to do. There has been criticism from time to time that they imposed an undue hardship on various people who would like to get into the Association, who were interested in its work, and could undoubtedly contribute something to its value, but who did not have the specific qualifications required.

To meet that condition, an amendment was proposed which is the first amendment to be considered. Mr. Cady, I believe, was also chairman of that committee, so we had better have Mr. Cady up here once again to tell us specifically just what the amendment in each case covers.

Amendments to the Constitution

Report by WILLIAM H. CADY

If you will all look at the back of the program, you will find the proposed amendments. The first one reads:

"Art. III, Par. 1: Strike out the last sentence: 'Such persons must, at the time of their election, be engaged in or directing work related to the application of dyestuffs, or to bleaching, or to textile finishing.'"

I think the intention of the men who drafted our Constitution six years ago was that the Association should be composed entirely of men actively engaged in textile work, but as the Association has grown we have found more and more that we need as active members men who are not necessarily now actively engaged in the industry but men who have the background of five years' practical experience. They may now be out of the textile game entirely or they may be occupying executive positions, so that they are no longer actively engaged in textile work, but they are just as valuable to us as if they were.

So the intention is merely to strike out that paragraph and make it unnecessary for a man at the time of his election to be actively engaged in any technical activity.

The second amentment is simply to add the words "and to hold office" to Article III, Paragraph 2. This paragraph defines who shall be the active members. If this amendment is adopted it will read, "Active members only shall have the right to vote in the busi-

ness of the Association and to hold office." Of course, it stands to reason that that should be so.

Associate Membership

The third amendment has reference to a new classification of membership which the Council seems to have found necessary. There have been a number of cases where men have made application for membership in this Association who did not possess the full qualifications for membership. We do not think that those men should become active members, but we do think they should be permitted to share in the benefits of this Association, so we have decided to propose the creation of Associate Membership which, as you see from the proposed amendment, "shall consist of persons who lack the qualifications of Active Membership but are interested in the objects of the Association."

In Article III, Paragraph 5, we simply change the wording so as to make provision for associate membership. We propose that applications for Active, Junior, Associate and Corporate Membership shall be transmitted in writing to the Secretary, but only applications for Active and Junior Membership shall be accompanied by the names of two members of the Society, and so forth—because it is only the applications of Active and Junior Members that have to be sponsored by two members of the Association. An application for Associate Membership does not have to be so sponsored.

In Article IV, again we simply change the wording to make provision for the new class of Associate Membership. This amendment reads: "At stated periods the Secretary shall mail to the members a list of all applicants for Active and Junior Membership, together with the names of the members who certify to them."

But on talking the matter over yesterday at the Council meeting, it was decided to add to that the following words, "also a list of all applicants for Associate Membership." In that case, there will be no names of members to certify to them, but it seemed to those of us who talked this matter over that it would be just as well to post the names of all applicants for membership, whether for Active, Junior, or Associate Membership, so that the members at large could look them over, and if at some time a man is proposed for membership in any of those classes who for any reason at all should not be admitted to the Association, the Council will have ample time to receive protests.

Article VIII, Paragraph 1—The only change in that paragraph is to provide that the Chairman of the Research Committee shall be a member of the Council ex-officio.

Article XIV, Paragraph 1—It was thought best to put down in black and white that the Local Chairman (that is, Chairmen of every Local Section) being ex-officio members of the Council, must therefore be Active Members of the Association, because it would not be proper for an Associate Member (and therefore a man who has not the right to vote or to hold office) to be sitting in the Council of the Association.

I think that is all, Mr. President.

President Killheffer—I will entertain a motion for the adoption of these amendment, either singly or en bloc, as it may seem wise to you.

I might explain the procedure. The amendments must be published, in accordance with the Constitution (which has been done on this printed folder which you have all received), and then at this meeting they must be passed by a two-thirds vote, and that passes the matter to a further letter ballot of the Association. So that what we are passing on now is the question as to whether these amendments shall be passed to a letter ballot of the entire Association.

Dr. W. M. Scott—Mr. President, I move the passage of these amendments en bloc to a letter ballot of the Association.

. . . . The motion was regularly seconded. . . .

President Killheffer—It has been regularly moved and seconded that these amendments be passed en bloc to a letter ballot of the Association. Is there any question?

W. H. Cady—Mr. Chairman, I should like to ask Dr. Scott if he included in his motion my amendment to the amendment to Article IV?

Dr. Scott—That was my intention. I intended to include the amendment as read by Mr. Cady.

President Killheffer—That makes it all right, if that is agreeable to the seconder.

Prof. L. A. Olney—I seconded that motion, and that is agreeable to me.

President Killheffer—Is there any further question? It has been regularly moved and seconded that these amendments as read by Mr. Cady be passed to a letter ballot of the Association.

. . . The question was put to a vote, and carried. . . .

President Killheffer—I therefore declare these amendments regularly passed to a letter ballot of the Association.

Is there any further business to come before the meeting?

P. F. Estey—Since the foundation of our Association, Professor Olney, as we all know, has given an unlimited amount of his time and thought to our affairs. I think it would be appropriate at this time to extend to him a rising vote of thanks (that is the least we can do) to

show that we appreciate what he has done for our Association.

I offer that as a motion. (Applause.)

President Killheffer—I don't think that motion really requires a second because we are all perfectly, not willing, but anxious to acknowledge our debt of gratitude and appreciation to Professor Olney for the wonderful service that he has rendered to this Association, from the period of its birth to the present time, when we can at least call it a lusty infant.

Those first years are usually very trying in the case of a new infant, and I don't think that this was much of an exception. So let us just rise at this time and by so rising show Professor Olney some small measure of our appreciation for the service he has given us.

. . . The motion was carried by a unanimous rising vote. . . . (Applause.)

President Killheffer—Is there any further business?

Prof. L. A. Olney—The members of the Association may or may not be fully conversant with the fact that our Treasurer, Winthrop C. Durfee, earlly last summer was stricken with a serious illness which confined him to his home for several months. At the present time, I am glad to report, he is improving very rapidly and is able to be out and walk around to a considerable extent.

I thing it would be very fitting if the Secretary of our Association would send a telegram to Mr. Durfee, expressing our great pleasure at the news that he is on the road to recovery, and I would present that, Mr. President, as a motion.

. . . The motion was regularly seconded. . . .

President Killheffer—It has been moved and seconded that the Secretary be instructed to send Mr. Durfee a message of good-will and cheer at the information we have received of his being on the road to recovery.

. . . The question was unanimously carried. . . .

Discussion of Registration Fee for Annual Meetings

Prof. L. A. Olney—I have one more matter that I should like to bring up at this time.

At one of our Council meetings several months ago the subject was brought up as to the advisability of having a registration fee at our annual meetings. You may be acquainted with the fact that most associations do have such a fee. The American Chemical Society for a number of years has had a registration fee of $3. I do not think that our Association needs one as large as that, but I think you can readily understand that there are many general expenses in connection with one of our meetings which should not be borne by the local section in which the meeting is held, because such a section is necessarily doing everything it can to make the meeting a success and for that reason spending considerable money itself.

It was thought best to bring this matter before the Association, simply to get an expression in regard to it, and I am simply representing the Council in this matter.

In order to get an expression of opinion in a perfectly legal way and to bring the matter before the meeting for discussion, I will make a motion that the matter of charging a registration fee at the Annual Meeting be left in the hands of the Council.

. . . The motion was regularly seconded. . . .

President Killheffer—It has been regularly moved and seconded that the matter of further consideration of the advisability of a registration fee at our annual meetings be left in the hands of the Council.

Prof. Olney—With power to act, I might add.

President Killheffer—With power to act, if that is agreeable to the seconder.

Is there any discussion on this motion?

Prof. E. C. Bertolet—The registration fee in the American Chemical Society, I believe, had its inception at the Philadelphia meeting in 1919. To entertain a group of 2,500 men required some money and some preparation.

A meeting of this type isn't nearly so difficult, yet it entails a great deal of work. I think it is only fair to the local sections that they should be relieved somewhat of this responsibility. All of the local sections, I am sure, could raise the money, if necessary, but if each one who attends the meeting would just add a little bit, perhaps a dollar, to the treasury of the local section, that would be an easy way to finance these meetings.

I most sincerely hope that the Council will make a favorable decision in reference to this matter, and let all of us who attend these meetings bear a little share of the expense. (Applause.)

President Killheffer—I might say that the expenses of these meetings are very much like the taxes that you pay; you don't pay them directly; you pay them indirectly. That is what you are doing in the case of this meeting, because by the simple expedient of adding it to the cost of the banquet ticket, you are defraying the cost of the meeting. (Laughter.) It may be that some of the other sections haven't as much "brass," or whatever you want to term it, as the New York Section, but there are considerable expenses in connection with such a meeting, and we are not at all sure that that simple expedient is going to take care of all of them. However, we feel pretty confident that it will bear a major portion of them, judging from the attendance.

Prof. Olney—Mr. President, if I might just add a word, I think you will all appreciate the fact that the recording of the minutes of the Annual Meeting is a

very expensive matter. It necessarily must be so, because we endeavor to take down everything that is said, for the benefit of the members, and that takes quite a little money from the general treasury of the Association. I think a portion of that registration fee might well go for that purpose.

President Killheffer—You have all heard the motion. All those in favor of entrusting this job to the consideration of the Council will please signify by saying "aye"; opposed "no." It is so ordered.

President Killheffer—Is there anything further to come before this meeting? If not, we will stand adjourned. . . . Several announcements were made. The meeting adjourned for luncheon at 12.35.

[*The Proceedings of the Saturday Afternoon Session of the Seventh Annual Meeting will be published in the next issue.*]

Applicants for Membership

Active Membership

Baker, Abel W., color mixer, Papyrus Company, Elizabeth, N. J. Sponsors: George C. Lommel and Charles H. Jones.

Blair, Samuel, colorist, Imperial Printing & Finishing Company, Bellefont, R. I. Sponsors: Herbert Kuhl and A. J. Bearcovitch.

Hummel, August, manufacturer textile chemicals, 90 West Street, New York City. Sponsors: E. H. Killheffer and Charles F. Schaumann.

Knaeble, Eugene C., salesman, Philadelphia, Pa. Sponsors: E. C. Bertolet and P. Theel.

Kuhl, C. W., president and general manager, 451-453 Washington Street, New York City. Sponsors: E. H. Killheffer and C. F. Schaumann.

MacDougall, Robert S., superintendent Imperial Printing & Finishing Company, Bellefont, R. I. Sponsors: H. Kuhl and A. J. Bearcovitch.

Pohlmann, George C., superintendent of dyeing and chemistry, Keene, N. H. Sponsors: A. K. Johnson and W. P. Heintz.

Roux, Eugene M., dyer, The Schwarzenbach Huber Company, Union City, N. J. Sponsors: E. L. Maupai and P. H. Stott.

Wilson, G. Edwin, textile chemist, Boger & Crawford, Philadelphia, Pa. Sponsors: R. J. Guertin and E. C. Bertolet.

Junior Membership

Carr, Frank A., head dyer, U. S. Dye Works, Inc., Paterson, N. J. Sponsors: Joseph Colman and A. J. Winkler.

ASSOCIATION BADGES

The lapel button badge illustrated herewith is worn by members of the American Association of Textile Chemists and Colorists.

The three "rings" are enameled in red, yellow and blue, respectively, and the initials and border are brought out in gold. The general effect is exceedingly attractive.

Badges may be secured at $1.50 each by addressing the Secretary.

WALTER E. HADLEY,
5 Mountain Avenue,
Maplewood, N. J.

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

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CLAYTON HOAGLAND
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THE "ORPHAN ANNIE" OF THE TEXTILE INDUSTRY

FOR many years the textile industry has had an itinerant orphan in its midst—an orphan with a long name. It is called Responsibility for Damage to Fabrics in Cleaning and Laundering. No one will take in this Responsibility. No one can tell where it belongs; in fact, no one seems to know. The Textile Manufacturers, for reasons clear enough to them, all but disown the orphan. They believe it was created in part by the Consuming Public and in part by the Dry Cleaners and the Laundries. But the Laundries and the Cleaners, for reasons clear enough to themselves, refuse to take *all* of the Responsibility, avowing that it is more closely related to the Mills. There would seem to be a call for a mediator who will point out that the Responsibility's real place may be found only if all members of the textile family strive for mutual understanding of the problem and more reasonable co-operation in working out a solution.

We cannot say that this orphan Responsibility has been neglected. On the contrary, its welfare seems to have been the subject of much heated discussion on several occasions by representatives of the Cleaners and the Laundries and the Mills. Some very recent discussion of this nature will be published in the Proceedings of the Annual Meeting of the A. A. T. C. C. It makes enlightening reading for all who are interested in the orphan's ultimate fate.

Not a simple problem, no matter how you look at it, this one of finding a place for the Responsibility. More complicated than it outwardly appears, even on the surface it has as many angles as an old horse. The problem has not been solved, because every member of the textile family insists on holding to its own particular angle. But is it not obvious that all groups in the textile industry are equally concerned—the Mills, the Cleaners and Laundries, and even the Retailers and other apparel trades? No one of them can justly disclaim some relation to the Responsibility.

How do the Mills feel about it? When they are urged by the others to make better fabrics that will stand ordinary cleaning and laundering, they argue that this is not always possible under present market conditions. They maintain that in order to exist they must make goods to sell at a price; a price which, in too many cases, does not cover the cost of making fabrics of the desired qualities. And, further, consumers are continually demanding cheaper fabrics and then blaming the laundries and the dry-cleaners if those fabrics are damaged during renovation. If the fabric manufacturer makes only goods that will clean with serviceable satisfaction, he cannot always get for them a price that will net a fair profit; for he must compete with inferior goods produced at lower cost. To meet competition he must make goods that will fill his orders; even though they are not of highest quality, they are the best for the price. Some of these contentions, it must be admitted, are not unjustified.

From what angle do the maintenance groups view the situation? They comprise the dry-cleaners and dyers and the laundries; and they have been campaigning vigorously for *better fabrics*, in the belief that, in the words of Arthur Heinze of the National Association of Dyers and Cleaners, "Only fabrics designed for satisfactory wear should be distributed to the American people." They insist that they have no control over the conditions in fabrics and apparel for which the public holds them responsible. But these laundry owners and dry-cleaners are at least making commendable efforts toward closer co-operation with the textile mills. They are right in believing that only co-operation of this type will eventually untangle the snarl.

The whole problem is complicated not only by the cross-purposes and conflicting viewpoints of these various trade groups, but by a number of technical factors that render it even more complex. Trouble arising from damage to fabrics in laundering or cleaning is traced back to several causes involving one or more such factors as:

1. Dye fastness.
2. Weighting (in silk).
3. Finishing methods.
4. Shrinkage.
5. Rayon in mixed goods.
6. Improper use of fabrics by cutting-up trades.
7. Misbranding.

The last item alone, the labeling of fabrics as "washable" or "guaranteed fast," has given rise to innumerable cases of trouble between the public and the maintenance groups and between the latter and the mills. The terms "washable" and "fast color" have become old bones of contention because they have not been

satisfactorily defined. The cleaners and laundry owners claim that the mill men are not sufficiently educated regarding modern laundry and dry-cleaning practice, and for that reason cannot accurately label their goods. They would have mills design and process goods to meet the conditions of standard laundry and dry-cleaning practice.

During the discussion at the meeting of the A. A. T. C. C. referred to, a member suggested that the dry-cleaners and the mills agree upon some mark that can be placed on fabrics to denote their cleanability, for the guidance of public and cleaner alike. This, again, calls for proper co-operation, leading to some standardization or *definition* of the terms "cleanable" and "fast."

The research activities of the various textile trade groups have some such definition in view. Each group has concentrated some worthy effort on the problem. The American Association of Textile Chemists and Colorists, largely representing the mills, has been working on fastness standardization. Those in the maintenance groups, the laundry owners and dry-cleaners, have been alertly compiling data to justify their contentions and have co-operated with each other. The National Association of Dyers and Cleaners has just established an institute for instruction of members in cleaning practice and textile mill methods, and for research as well. The association also has a chemist at the Bureau of Standards. A similar group working on dry-cleaning, under the name of the Mundatechnical Society, has a fellowship at the Mellon Institute. The Laundryowners' National Association also has an active fellowship at Mellon. The wholesalers and other apparel trades co-operate through a Joint Committee on Misbranding.

What may be expected from all this effort? One sound objection that has been voiced is that these various committees and fellowships are too intent on solving the problems of their own special group when they should be interested in *co-operating* with the other groups. Each is ready to die for its own interests. Those textile manufacturers who believe that it is solely the problem of the dry-cleaners and laundries are holding to this narrow view; equally narrow would be any contention of the maintenance groups that the mills should assume all responsibility. It is everybody's problem.

If the manufacturers were to co-operate more closely among themselves on the policy of making only high-grade goods that will stand up in the washroom or cleaning plant, they could probably improve *their* position. For them to work with the maintenance groups, however, would be far more effective. Some of the mill men, in fact, at a meeting held in Washington last November, did sit around the table with members of the laundry and dry-cleaning trades and the retail clothiers, for the purpose of discussing shrinkage; and a committee was formed representative of all these groups to make further study of the subject.

By thus co-operating on each of the other technical problems that are causing trouble, it ought to be possible at least to reduce the entire matter to a few major points of contention and to iron out these by establishing definite standards that can be put into terms clearly and correctly understood by all concerned. The mills can win the wholehearted commendation of the other groups by taking an active part in all future co-operative efforts to clear up this complex situation.

NO REASON TO RELAX

THAT the British dyestuff industry will not enter officially the agreement recently signed by the French and the German chemical trusts has been reported from Paris. This would seem to confirm the opinion voiced by the president of Eugene Suter & Co. a few weeks ago, when he returned from Europe after several months' study of conditions in the foreign chemical field. Mr. Suter declared that England was indisposed to enter the chemical entente recently planned.

Does this news offer any consolation to those in the American dye and chemical industry who have become alarmed over the gathering of European chemical trusts under one working agreement? We do not think so. Even granting that the British will keep to themselves, our industry still faces a strong union of foreign trusts on the Continent and a single powerful trust in England. The French dye industry is not one to be sniffed at. Its resources linked with those of the huge I. G., and possibly with the Belgian and other national trusts, a combination has resulted that is sufficiently dangerous to our export trade to warrant a strengthening of the American industry. Neither may we sniff at the Imperial Chemical Industries, Ltd., of Great Britain, for we have nothing so strong in our own industry as a combination of the five largest units in the country. Until we have made our position stronger, both at home and abroad, vigilance cannot reasonably be relaxed.

NEW BLOCK-PRINTING PROCESS USES SOAP CAKES

A method of block printing on textiles, greeting cards and other material has been invented in which cakes of soap are used instead of the customary wood or linoleum blocks. The principal of the process is interestingly described in a brochure written by Benjamin Miller, a well-known artist, and distributed by the Procter & Gamble Company.

As in other block printing, it is the surface of the block which prints the design and the parts cut away which leave an area of white when printed. Unlike woodblock work, however, Mr. Miller shows that with soap a separate block is not needed for each color. It

is necessary only to paint the various areas with the colors desired, and print as when using one color. Ordinary artists' tube oil paints, mixed with turpentine to the desired consistency, are suitable.

In printing with soap the design selected must be traced with a finely pointed indelible and letter-copying pencil on thin tracing paper or tissue which is cut larger than the design so that it may be bent over the surface of the soap used and fastened with thumbtacks. The design is reproduced by placing the side drawn on against the selected surface and pressing it down firmly with a wet piece of white blotting paper. When the design is transferred, the paper is removed and the parts of the design not to be reproduced are cut away with the sharp point of a knife. Paint is then applied to the surfaces remaining, after which the block is placed on the paper or object to be printed, painted side down, and pressed firmly for a few minutes until the impression is clear.

Holiday greeting cards, book plates, monograms, seals, and designs on frocks, curtains and linens of all kinds are among the different articles which may be printed in this manner.

The booklet, entitled "Block Printing with Ivory Soap," is published by the educational department of the Procter & Gamble Company, Cincinnati, Ohio, and may be obtained for 10 cents.

DYES IMPORTED IN NOVEMBER

(*Continued from page 6*)

Name of Dye and Manufacturer	Quantity (pounds)
Acid Rhodamine BG—(IG)	750
Alizarine Direct Blue RBX—(IG)	25
Alizarine Direct Red 3G—(Q)	22
Alizarine Supra Blue A Powder—(IG)	667
Alkali Fast Green 10G—(IG)	350
Azo Fast Blue BD, BD Conc.—(IG)	150
Brilliant Acid Blue FF—(By)	441
Brilliant Milling Blue B—(C)	
Brilliant Milling Blue B, FG—(IG)	1,553
Brilliant Silk Blue B—(I)	330
Brilliant Wool Blue FFR Extra—(By)	
Brilliant Wool Blue FFR Extra—(IG)	3,975
Cashmire Black TN—(IG)	1,000
Cloth Fast Orange G—(I)	110
Cloth Fast Red 3B—(I)	331
Cloth Fast Yellow G—(I)	551
Fast Acid Pink B—(IG)	25
Fast Jasmine G Conc.—(G)	1,212
Fast Light Red G—(By)	26
Fast Light Red R—(Q)	26
Indocyanine B Powder—(A)	1,102
Ink Blue BITBN—(IG)	300
Metanil Red 3B Extra—(IG)	100
Milling Green B High Conc.—(Q)	110
Milling Red 5BA—(IG)	400
Milling Violet R—(Q)	26
Milling Yellow H3G—(IG)	50
Milling Yellow O—(IG)	500
Minaxo Acid Brown G—(IG)	200
Naphthol Black BGN Conc.—(IG)	150
Neolan Blue GG—(I)	1,102
Neolan Blue RR—(I)	441
Neolan Orange G, R—(I)	441
Neolan Violet Brown B—(I)	220
Novazol Acid Blue BL Supra, GL Supra—(G)	220
Novazol Blue B—(G)	2,205
Novazol Violet B—(G)	551
Onis B, 3B—(IG)	250
Patent Black N—(IG)	100
Pilatus Fast Blue BR, GG—(IG)	200
Pilatus Fast Green BL Conc.—(IG)	400
Pilatus Fast Pink B—(IG)	100
Polar Brilliant Red B Conc.—(G)	551
Polar Gray—(G)	551
Polar Red B Conc.—(G)	551
Polar Red 3B Conc.—(G)	221
Polar Yellow 2G Conc.—(G)	1,102
Polar Yellow R Conc.—(G)	55
Selan Printing Brown 3R—(IG)	100
Silk Blue BS/IC—(IG)	25
Silk Yellow R—(IG)	800
Sulpho Rhodamine G Extra—(IG)	25
Sulphon Orange G—(IG)	150
Sulphon Yellow 5G—(IG)	200
Supramine Black BR—(IG)	1,000
Supramine Bordeaux B—(IG)	100
Supramine Red B, 3B, 2G—(IG)	1,425
Supramine Yellow R—(IG)	150
Wool Fast Yellow R—(IG)	112
Xylene Blue FF Conc.—(S)	2,000
Xylene Milling Orange R Conc.—(S)	1,000
Xylene Milling Violet B Conc.—(S)	500

Vat Dyes

Alizarine Indigo 5R Paste—(IG)	400
Anthra Orange RH Paste Fine—(IG)	
Anthra Orange RH Double Paste Fine (s. s.)—(IG)	1,800
Anthra Pink B Extra Paste—(IG)	1,500
Anthra Pink R Extra Paste Fine—(IG)	500
Anthra Scarlet B Powder (s. s.)—(IG)	600
Ciba Pink BG Paste—(I)	3,304
Cibanone Brown B2R Paste—(I)	110
Cibanone Orange 6R Powder (s. s.)—(I)	1,100
Eridan Brilliant Scarlet B Paste—(IG)	900
Grelanone Blue RL Paste—(GrE)	60
Helindone Fast Scarlet G Paste—(IG)	2,500
Helindone Printing Black RD Paste—(IG)	12,500
Hydron Brown G Paste, R Paste—(IG)	2,044
Hydron Pink FF Paste—(IG)	2,500
Hydron Scarlet 3B Paste—(C)	1,763
Hydron Violet R Powder (s. s.)—(IG)	250
Hydron Violet BF Paste Highly Conc.—(IG)	100
Hydron Violet RF Paste Highly Conc.—(IG)	500
Hydron Yellow GG Powder (s. s.)—(IG)	600
Hydron Yellow NF Paste—(IG)	500
Indigosol O4B—(DH)	660
Indigosol Pink IR Extra—(DH)	220
Indigosol Scarlet HB—(DH)	110
Indigosol Violet ALB—(DH)	110
Indigosol Yellow HCG—(DH)	165
Vat Blue RSN Powder—(IG)	50
Vat Blue Green B Double Paste Fine (s. s.)—(IG)	1,000
Vat Brilliant Blue R Paste Fine—(IG)	
Vat Brilliant Blue R Powder (s. s.)—(IG)	1,400
Vat Brilliant Orange RK Powder (s. s.)—(IG)	156
Vat Brilliant Violet 4R Powder (s. s.—(IG)	300
Vat Brown 2G Paste—(B)	

Name of Dye and Manufacturer	Quantity (pounds)
Vat Brown 2G Powder (s. s.)—(IG)	1,324
Vat Golden Orange 3G Powder (s. s.)—(IG)	800
Vat Golden Yellow GK Double Paste Fine (s. s.)—(IG)	8,000
Vat Gray RRH Paste Fine—(IG)	
Vat Gray RRH Powder (s. s.)—(IG)	450
Vat Green G Double Paste (s. s.)—(B)	
Vat Green G Powder (s. s.)—(IG)	1,718
Vat Green GG Powder (s. s.)—(IG)	200
Vat Orange 3R Paste Fine—(IG)	1,468
Vat Pink B Double Paste (s. s.)—(IG)	
Vat Pink B Powder (s. s.)—(IG)	1,500
Vat Printing Black BR Paste—(By)	441
Vat Printing Brown R Paste—(By)	
Vat Printing Brown R Paste—(IG)	6,322
Vat Red 2G Paste—(B)	440
Vat Yellow GGK Paste—(IG)	200
Vat Yellow RK Powder (s. s.)—(IG)	250
Vat Yellow Brown 3G Paste—(IG)	353

Mordant and Chrome Dyes

Acid Alizarine Gray G—(IG)	500
Acid Anthracene Brown PG—(By)	717
Acid Chrome Red B—(IG)	200
Acid Chrome Yellow RL—(IG)	300
Alizarine Fast Gray 2BL—(IG)	50
Alizarine Fast Green 2B—(I)	110
Anthracene Chrome Blue F—(IG)	100
Azol Printing Red 2B Extra—(IG)	50
Chromanol Black RVI—(DH)	55
Chrome Blue SW—(Q)	26
Chrome Fast Xanthine 2R—(DH)	220
Chromocitronine 3R—(DH)	330
Chromorhodine 6GN Extra—(DH)	220
Chromoxane Pure Blue BLD, B—(IG)	550
Eriochrome Blue S—(G)	220
Eriochrome Brilliant Violet B Supra—(G)	551
Eriochrome Red G—(G)	1,102
Metachrome Blue Black 2B Extra Powder—(A)	
Metachrome Blue Black 2BX—(IG)	750
Metachrome Brown 6G—(IG)	500
Omega Chrome Brown EB—(S)	1,022
Omega Chrome Brown G Conc.—(S)	500
Radio Chrome Blue B—(IG)	200
Ultra Orange R—(S)	1,000

Direct Dyes

Benzo Chrome Black Blue B—(IG)	100
Benzo Chrome Brown B—(IG)	150
Benzo Fast Brown GL—(By)	150
Benzo Fast Brown 3GL—(By)	560
Benzo Fast Brown RL—(By)	
Benzo Fast Brown RL—(IG)	1,424
Benzo Fast Orange 2RL—(IG)	400
Benzo Fast Yellow RL—(IG)	1,500
Benzo Red 12B Powder—(By)	533
Benzo Rhoduline Red B, 3B—(IG)	700
Brilliant Benzo Fast Yellow GL—(By)	220
Brilliant Benzo Green B—(By)	
Brilliant Benzo Green B—(IG)	648
Brilliant Benzo Violet 2BH—(IG)	100
Brilliant Benzo Violet 2R—(By)	220
Brilliant Congo Blue 5R—(IG)	100
Brilliant Congo Violet R—(IG)	600
Brilliant Fast Blue 3BX—(IG)	700
Brilliant Pure Yellow 6G—(IG)	
Brilliant Pure Yellow 6G—(By)	750

Name of Dye and Manufacturer	Quantity (pounds)
Brilliant Sky Blue 8G Extra—(By)	331
Chicago Red III—(G)	2,205
Chloramine Fast Orange 2G Conc.—(S)	200
Chloramine Fast Orange G Conc.—(S)	500
Chlorantine Brown Y—(I)	551
Chlorantine Fast Blue 2GL—(I)	2,204
Chlorantine Fast Blue 4GL—(I)	551
Chlorantine Fast Brown 3RL—(I)	1,085
Chlorantine Fast Gray B—(I)	551
Chlorantine Fast Green B—(I)	441
Chlorantine Fast Violet 5BL—(I)	1,102
Chlorantine Fast Violet 2RL—(I)	220
Chlorazol Drab RH—(BDC)	240
Diamine Azo Green 3G—(C)	1,100
Diamine Brilliant Scarlet S—(IG)	500
Diamine Catechine B, G—(IG)	600
Diamine Fast Brown R, R Conc.—(IG)	700
Diamine Fast Orange EG—(IG)	1,150
Diamine Fast Orange ER, ER Conc.—(IG)	1,300
Diazanil Scarlet 3BA Conc.—(IG)	75
Diazo Blue—(Q)	26
Diazo Brilliant Green 3G—(IG)	525
Diazo Brilliant Orange 5G Extra—(IG)	100
Diazo Brilliant Scarlet 6B Extra—(IG)	200
Diazo Brown 6G—(IG)	300
Diazo Brown 3RB—(IG)	150
Diazo Fast Violet 3RL—(IG)	100
Diazo Sky Blue B—(IG)	
Diazo Sky Blue B—(By)	860
Diazo Sky Blue G—(Q)	26
Diazo Sky Blue 3G, 3GL—(IG)	1,600
Diazol Light Red N8B—(CN)	1,102
Diphenyl Fast Bordeaux BC—(G)	110
Diphenyl Fast Bronze B—(G)	551
Diphenyl Pure Yellow 5G Conc.—(G)	55
Direct Pink 3B—(Q)	26
Direct Sky Blue H—(Q)	26
Fast Cotton Gray BL, VL—(IG)	1,100
Fast Cotton Rubine B—(IG)	100
Fastusol Red Violet BBL—(IG)	100
Fastusol Violet BL—(IG)	100
Minaxo Light Pink BBX—(IG)	300
Paper Red A Extra—(IG)	500
Pluto Black G Extra—(IG)	650
Rosanthrene Violet 5R—(I)	110
Zambesi Black V—(IG)	100

Direct Dyes for Artificial Silk

Cellit Blue B—(IG)	100
Cibacete Turquoise Blue Paste—(I)	440
Cibacete Yellow 3G Paste, R Paste—(I)	495
Duranol Blue R Paste—(BDC)	60
Duranol Red G Paste—(BDC)	460
Duranol Yellow Paste—(BDC)	60
Setacyl Direct Blue 2GS Powder, R Powder—(G)	771
Setacyl Direct Orange 2R Powder—(G)	331
Setacyl Direct Red B Powder—(G)	331
Setacyl Direct Violet R Powder—(G)	331

Rapid Fast Dyes

Rapid Fast Orange RH Paste—(IG)	3,000
Rapid Fast Red GZ Paste—(IG)	2,000

Basic Dyes

Acridine Flavine RD—(DH)	110
Astra Phloxine FF Extra—(IG)	100

Name of Dye and Manufacturer	Quantity (pounds)
Basic Black—(CN)	110
Basic Red Y—(Q)	25
Brilliant Acridine Orange 3R—(DH)	110
Brilliant Acridine Orange 5R—(DH)	220
Rhodamine 6GH Extra (s. s.)—(S)	850
Rhodamine 6GDN Extra (s. s.)—(IG)	3,550
Sulphur Dyes	
Immedial Brown W Conc.—(IG)	500
Indocarbon CL Conc.—(IG)	2,000
Indocarbon SN—(IG)	5,000
Katigene Indigo CLGG Extra—(IG)	500
Pyrogene Pure Blue 3GL—(I)	2,204
Sulphur Blue—(Q)	527
Sulphur Brown CL/4R—(IG)	100
Color-Lake and Spirit-Soluble Dyes	
Alizarine Astrol (oil soluble)—(IG)	300
Hansa Yellow G Powder—(IG) Lake Yellow G Powder—(M)	520
Hansa Yellow 5G Powder—(IG)	100
Hansa Yellow GSA Powder—(IG)	3,000
Hansa Yellow GA—(M)	176
Helio Bordeaux BL Paste—(IG)	2,080
Helio Fast Rubine 4BL—(IG)	200
Helio Red RMT Extra Powder—(IG)	500
Oil Green ALB Lumps—(IG)	100
Paper Fast Bordeaux B—(IG)	250
Tero Brown FG—(IG)	25
Tero Red FG—(IG)	50
Unclassified Dyes	
Grasol Yellow R—(G)	110
Leather Brown 5RTX—(IG)	25
All other—(Q)	34

A New Effective Moth-Repellent

Clothes-Moth Repelling Properties of Products Derived from Cinchona Bark Have Been Discovered.

TWO billion dollars is the conservative estimate of authorities as the annual damage in the United States due to injurious insects. Millions of dollars of this loss may be attributed to the clothes moth. Furthermore, the indications are that the damage done by clothes moths is becoming greater and greater each year because the insects are increasing in number.

Many methods for controlling the pest have been proposed. Clothes moths so readily adapt themselves to their food, however, that their voracious appetite is not curbed by any one or more of a large variety of chemicals, dyes, drugs or other adulterants which may be incorporated with it. Many different methods for controlling the insects have been proposed which range in effectiveness from nil to fairly good. Most control methods proposed depend upon malodorous substances or materials poisonous to human beings, as well as the pets.

Dry-cleaners are continually called upon to destroy clothes moths in many different kinds of articles of furniture and clothing. Because the need of more adequate control methods was recognized, the Mundatechnical Society of America, a group of the largest and most progressive dry-cleaners in the United States, commissioned their Fellowship in Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh, Pa., to study broadly the problem of developing more practicable methods for controlling the insect. The experimental work was started in 1922.

In consequence of this investigation a series of related products derived from cinchona bark have been found to fulfill, not only the clothes-moth repelling requirements of the dry-cleaner and dyer, but those of other industries as well. The study of the products has been extended with the idea of making them generally applicable in homes, stores, warehouses and factories whose materials are exposed to clothes moth attack.

The investigational plan was guided by definite criteria of excellence decided upon and adopted before the work was started. Mindful of objections to moth-repellents that had been recommended, the criteria of excellence for the moth-repellent that was to be developed were defined as follows:

(1) It must be inodorous.
(2) It must adhere evenly to the fiber treated, like a dyestuff.
(3) It must be unrecognizable on the fiber.
(4) It must not dust off.
(5) It must not affect adversely the physical properties of the textile fibers.
(6) It must be soluble in inexpensive organic solvents, such as petroleum naphtha, as well as in water.
(7) It must have no intoward physiological action; that is, it must be non-toxic to human beings.
(8) It must repel clothes moths.
(9) Its cost must be reasonable from the industrial viewpoint.

Upon undertaking to develop such a moth-repellent there was found to be little information regarding the toxicology of various chemicals on clothes moths. Reports were located regarding such substances as Martus Yellow dyestuff (sodium, calcium or ammonium salt of dinitronaphthol) which have been claimed to have moth-repellent properties because of the observation that materials dyed with the dyestuff or mixtures of dyestuffs containing it were immune from moth attack. Certain fluorides, salts of hydrogen fluosilicic acid, as well as other acids and their salts, such as phosphotungstic, fluotitanic, antimony-tungstic, phosphomolybdic, tungstic, uranic, colloidal silicic, colloidal stannic, molybdic and antimonic acids, were reported in patents on protecting wool from clothes moths. In the course of the investigation these and related materials were tried. Organic compounds similar to Martius Yellow were prepared and used in experiments. A whole series of bitter substances, intestinal irritants, germicidal and antiseptic substances, local anesthetics and astringents were experimented with. No substance having one of these physiological effects

was found to be an effective moth-repellent. However, certain products of cinchona bark were ascertained to be excellent repellents. Peculiarly the properties of these substances are a combination of many of the properties which formed the basis for choosing the various groups of substances for study. They are: (1) salt-forming organic chemicals, (2) bitter substances, (3) intestinal irritants, (4) germicides and antiseptics, and (5) astringents. Some of their derivatives are also (6) local anesthetics. Products of cinchona bark are known for their specific action on malarial parasites and as antipyretics.

It happens that the products of cinchona bark which were found to be moth-repellents can be prepared to be soluble in water or in any of the organic solvents. This property is an exceedingly important one for several reasons:

First, when applying a moth-proofing solution on wool, for example, by spraying, the solvent or vehicle for carrying the repellent must be one that readily wets and penetrates the fiber. Certain organic solvents excel in this property, while water, on the other hand, has poor penetrational properties. Water sprayed on wool stands out in little droplets on the surface of the fibers.

Secondly, it is often desirable to choose the solvent or vehicle for carrying the moth-repellent into the material treated in order to not affect adversely certain of its physical properties. For example, it is not practicable to treat with water or certain organic fluids. Furthermore, some fluids that can be used satisfactorily on undyed materials would be unsuitable for dyed material because of their effect on the dyestuff.

Since the discovery of the moth-repelling properties of the products of cinchona bark, they have been subjected to rigid laboratory and practical tests. Moth-proofing service based upon the products has been offered in the plants of members of the Mundatechnical Society for the past two years. The equivalent of several hundred thousand pounds of wool, in the form of garments, upholstered furniture, rugs, fur coats and other house furnishings, have been treated. The plants in which the service was given are located in eight large cities of the eastern, southern and mid-western parts of the United States, and the successful extensive use of the process in several sections of the country has indicated its adaptability to the dry-cleaning business.

The Mundatechnical Society of America has obtained patent protection on the process in the United States, and either has been allowed or has pending in the other important countries of the world. The society is now considering plans for making the moth-repellent available to other industries and also in households.

A booklet recently issued by the Niacet Chemicals Corporation, of New York, describes the synthetic organic chemicals manufactured by the firm, giving the properties and uses of acetaldehyde, paraldehyde, acetaldol and crotonaldehyde.

S. R. DAVID COMBINES WITH PALATINE

Among the newest combinations in the dyestuff industry announced is that of S. R. David & Co., of Boston, and the Palatine Aniline & Chemical Corporation, of Poughkeepsie, N. Y. The former well-known concern has purchased an interest in the Palatine corporation and, effective January 1, will market the products of its manufacture.

PRESTON RHODES BUSINESS TAKES NEW BUILDING

Need for more space because of greatly expanded business, it is announced by the firm of Preston T. Rhodes, of Philadelphia, dealers in chemicals and dyestuffs, has necessitated removal to larger and more conveniently located quarters at 112 Delaware Avenue, where the company will occupy the entire building.

The business conducted by Preston T. Rhodes is well known in the dyestuff trade of Philadelphia and its environs; among the principal products handled are colors, disinfectants, creosoles and co-efficients.

NEW RAYON PLANT IN HUNGARY RUN BY I. G.?

Back of a proposed new rayon factory to be erected in Hungary stands the German dye trust, according to some rumors emanating from Berlin and other European centers. It has been stated by Hungarian industrialists in Berlin that the Interessen Gemeinschaft has been negotiating in Hungary for the erection of a plant for manufacturing rayon and that such a plant would probably sell to the entire Balkan market, as only one other plant is operating in the country at present. The information is relayed via the Department of Commerce from Trade Commissioner Daugherty of Berlin.

A close syndicate of German soda ash manufacturers is foreseen in the announcement that the Chemische Fabrik Kalk G. m. b. H., of Cologne-Kalk, is negotiating with the German Soda Ash Syndicate. The Cologne works, which has an estimated annual production of 100,000 tons of soda ash, has heretofore been competing with the Syndicate, which is led by the German Solvay Works.

The German Soda Ash Syndicate, according to a Department of Commerce item, is said to control a production of more than one-half million tons annually, or about 80 per cent of German production. Other independent German producers are of comparatively little importance.

Commonwealth Color & Chemical Company has opened an office in Charlotte, N. C., at 307 Commercial National Bank Building. R. T. Grant, who has been connected with the dyestuff business for many years and well known to the Southern textile trade, will be in charge as Southern manager.

Technical Notes from Foreign Sources

Dyeing of Neps

The immature cotton fibers which are in the normal cotton fiber, and which vary in number in accordance with a number of different factors, such as variety of cotton, conditions of growth, etc., are known as "neps." The immature hair, examined under the microscope, is seen to consist of broad, flat ribbons, less twisted than normal hairs, sometimes discolored, often attached to particles of seed-coat, and in cross-section showing a much thinner wall than does the normal hair. These immature cotton hairs resist the spinning and weaving operations and project from the surface, forming ultimately a small tangled mass on the surface of the fabric.

There is quite a diversity of opinion as to the amount of color that will be absorbed by these nep hairs, and this is accounted for by the fact that some are in a very early stage of growth, while others are almost as mature as the fully ripe cotton hairs. It has also been stated that these immature fibers will dye almost to the same extent as the normal cotton fibers, but that the differences in shade are mainly due to optical effects, and practically disappear when the neps are immersed in a substance of high refractive power, such as Canada balsam. Calendering appears to intensify the differences; while mercerizing—that is, swelling of the fibers—renders the effect less obvious.

Certain dyestuffs possess the power of covering neps, while others show up the differences in affinity to a very marked degree. The direct cotton dyestuffs show considerable diversity in their power of giving level dyeings on both ripe and unripe fibers. As a general rule, the yellows, oranges and orange browns, together with a few reds, give even dyeings, while the blues, greens and blacks give uneven dyeings. A list of direct colors which are particularly well suited for dyeing neps in level shades is given in the original article.

The sulphur colors, as a class, give much more satisfactory results than do the direct cotton dyestuffs, the majority dyeing quite level and covering neps. The same is true of the basic colors and many of the anthraquinone vat colors. Indigo and other indigoid vat colors are, however, resisted by the neps.

In attempting to find some reason for the difference in dyeing of the neps in comparison with the normal cotton hairs, it was concluded that the difference in shade is probably due to the fact that in the normal cotton hair the secondary thickening is most highly colored, while in that of neps the cuticle only, or a lesser amount of secondary thickening, can be dyed. Certain dyestuffs appear to have the power of dyeing the cuticle more than others, and hence the difference in the shade can be minimized by their use. (Journal of the Society of Dyers and Colourists, 1927, pages 294-295.)

Dyestuffs Non-Fast to Ironing

The change in the color of dyestuffs when they are brought into contact with hot metallic surfaces is particularly manifested in the case of cotton dyeings. Many investigations have been carried out with the intent of discovering just why this happens. Some have believed that the non-fastness of the dyestuff to ironing is due to the possible existence of two forms of the color—namely, a water-containing form and an anhydrous form. Nevertheless, there are instances which appear to contradict this theory. Thus, when Diamine Blue 3R is employed in an aqueous solution, the color of the dyestuff is changed into a reddish shade when the solution is boiled, and vegetable fibers may be dyed a current red with this solution. All dyestuffs that yield such dyeings form two phases of different degrees of dispersion, of which the higher dispersed form dyes animal fibers a corinth red and the lower dispersed form dyes vegetable fibers a blue.

A rather thorough investigation has been made on this subject and upward of thirty of these dyestuffs have been tested. They belong principally to the blue and violet benzidine colors. Keeping the dyestuff in a dessicator over sulphuric acid generally induces the same phenomena, particularly in the case of the blue and violet shades.

The following observations have been made on the behavior of the solutions of dyestuffs: Fractional precipitation with the aid of electrolytes, such as sodium chloride, separates the lesser dispersed portion of the color. A blue precipitate is thus formed, while a current red filtrate in which cotton can be dyed remains. The different portions of the dye solution may also be separated with the aid of adsorbents. Ultrafiltration of the aqueous solutions often gives a reddish filtrate. The presence of two different pigments is also particularly clearly manifested in the case of such dyestuffs as Oxydiamine Blue R, Oxamine Blue 4R, Brilliant Azurin B and Diamine Brilliant Violet B, when they are subjected to capillary experiments. The limits between the two zones formed is sharply defined. Barium sulphate or alumina can be used as the adsorbents. It has also been found that there is a very definite ratio between the degree of distribution of the color between the adsorbent and the medium from which the dyestuff is adsorbed. There is also a definite relationship between the surface area of the adsorbent and that of the dispersed phase of the dyestuff in solution which affects the result of the adsorption.

The same behavior is observed in the case of the spun fibers. In addition to the external surface area of the fibers, the inner—that is, the intermicellular—area also plays a very important role. Differences in the magnitude of these surfaces are responsible for the blue coloring of cotton and the red coloring of wool in the dye liquors containing the aforementioned colors and their like. The results of the investigation allow the conclusion to be drawn that the woolen and the acetate fibers possess a greater internal surface area than cotton. Furthermore, the dyeings carried out with the aforementioned dyestuffs possess all the characteristics of substantive cotton dyeings. When a mixture of cotton and wool is boiled together in the dye liquor, the latter is colored a deep blue and the former a red.

From these investigations, as well as from others, it is possible to see that there does not appear to be any conclusive reason for the color changes in cotton dyeings made with these dyestuffs when the cotton materials are brought into contact with hot metallic surfaces. Nevertheless, the question is answered as to why the cotton and the wool fibers are differently colored. (Kolloid Zeitschrift, through Deutsche Faerber Zeitung, 1927, page 850.)

MILLS AND MEN

Harry Gwinnell, assistant designer at the Pontoosuc Woolen Manufacturing Company, Pittsfield, Mass., has resigned to accept a position with the Uxbridge (Mass.) Worsted Company.

W. P. Bolen has resigned as overseer of dyeing at the Monaghan plant of the Victor-Monaghan Company, Greenville, S. C.

The Franklin Rayon Mills, Inc., is the name of a new corporation which has been organized at Franklin, Tenn., under the laws of the State of Tennessee. A charter has been applied for with the following as incorporators: Harry Altman, Samuel Denmark, Philip Sears, W. A. Roberts and C. H. Corn. This corporation will manufacture cloth for the cutters of women's and men's underwear and neckwear; also for the scarf, dress goods, brassiere, bloomer, hat and kimona trades. The capitalization will be $65,000, fully paid in.

Everett W. Sweet has resigned as president of the Southern Dyeing Company, Burlington, N. C., which has operated a yarn-dyeing plant for about three years.

The A. E. Staley Manufacturing Company, corn oil, starch and syrup, Decatur, Ill., will shortly open a branch at Wythe Avenue and North Sixth Street, Brooklyn, N. Y.

Lloyd E. Jackson and George H. Johnson, Senior Industrial Fellows of Mellon Institute of Industrial Research, University of Pittsburgh, have been elected to honorary membership in the National Association of Dyers and Cleaners. Mr. Jackson, who is in charge of the research of the Mundatechnical Society of America, has made a number of notable contributions to garment cleaning practice and is the joint inventor of a successful process of mothproofing wearing apparel and housefurnishings. Mr. Johnson has enjoyed much success in the investigational work he is carrying on for the Laundry-owners' National Association; he is also the author of several standard treatises on textiles and laundering.

Fred Maxwell has taken a position as bleacher and mercerizer with the Crystal Spring Bleaching & Dyeing Company, Thwaites, Mass.

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i. e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

SALESMAN

Salesman wanted to represent in the Middle West American dyestuff manufacturer of full line of aniline colors. About thirty years of age. One having experience preferred. State qualifications and when available. Address Box 435, American Dyestuff Reporter.

EXPERIENCED CHEMIST WANTED

A prominent finishing plant bleaching, dyeing and mercerizing cotton piece goods needs the services of a capable chemist with actual plant experience. Dyeing includes direct, basic, sulphur and vat colors. It is desirable that this experience include a knowledge of rayon and Celanese mixtures, although lack of such experience would not bar an intelligent and ambitious man not afraid of work. If interested please state complete experience, age, whether married or single, salary desired, and give names of three references. Anyone answering this advertisement may be assured that the people by whom he is now employed will not learn of his possible interest in this subject. Address Box 473, American Dyestuff Reporter.

DYESTUFF SALESMAN

Wanted—An experienced high-grade dyestuff salesman with good knowledge of vats. One acquainted with Philadelphia territory preferred. Reply confidentially, giving age, experience, salary desired, etc. Address Box 438, American Dyestuff Reporter.